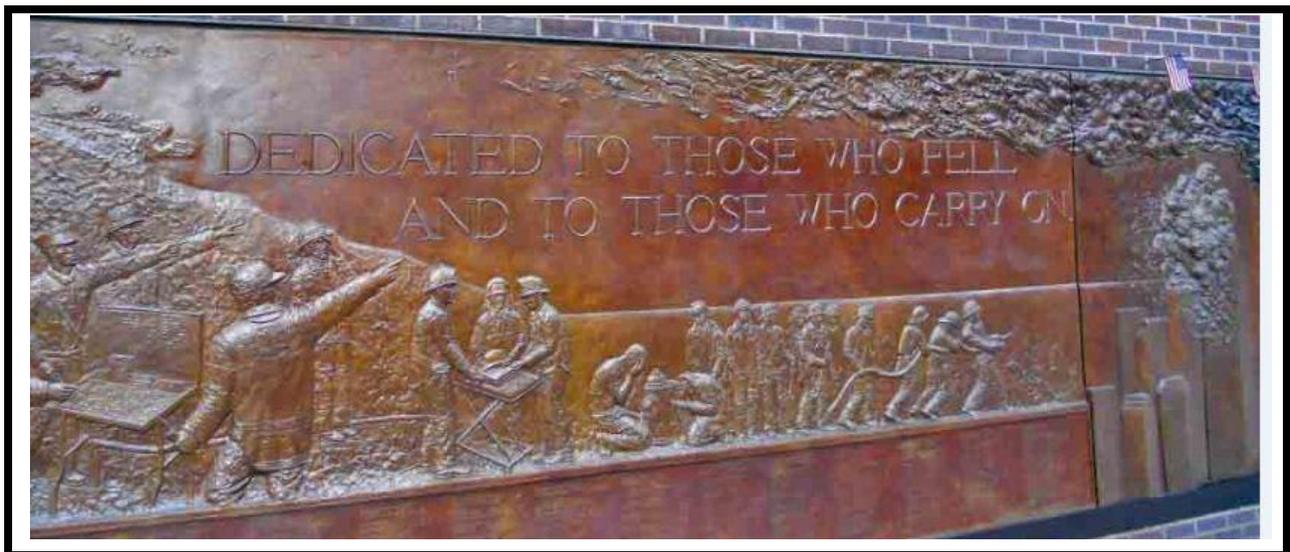




# IEEE New York Monitor

**Advancing Technology for Humanity**

**September 2011, Vol. 59, No. 9**



**Dedicated to those who fell and  
to those who carry on**

Photograph of copper plate on the outside wall  
of FDNY Engine 10 and Ladder 10



**Birth of the New WTC**



*Photographs taken around the World Trade Center*

**Our passions are, in truth, like the phoenix; when the old one burns away a new one rises from its ashes at once.**

- *Johann Wolfgang von Goethe (1749 -1832)*
  - *German poet, playwright and dramatist*
  - *Maxims and Reflections of Goethe, Penguin Classics*



**The heroes of Engine 10 Ladder 10**



**May we never forget**

Photograph of the copper plate on walls of Engine10 Ladder 10



*You must be the change you wish to see in the world*

*-Mahatma Gandhi*



# THE IEEE NY – MONITOR

September 2011, Vol. 59, No. 9

Editor: Amitava Dutta-Roy, PhD, Life Fellow

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## CONTRIBUTORS

The Monitor thanks the contributors from far and near for the interest they have shown in sharing their knowledge, ideas and hobbies with us and thus enriching the NY Monitor for the enjoyment and benefit of our readers. To our present and future contributors we say: please write or continue to do so!! We

would like to convey our appreciation to **John LeGates** of Harvard University for allowing us to reproduce the Part III of his article; **Tom Trainer**, director of product marketing at Gluster, Sunnyvale, California for his informative article and the video clip; **Ms. Nancy Yambem** for reviewing “A tragic story” and the two photographs including one of the Reflecting Pool at the new WTC, and **Raoul Drapeau** (the author) and **Mel Olken**, our distinguished historian who gave us the permission to insert the link to an article published in the IEEE P&E magazine of which he is the editor-in-chief. Thank you all! The photographs around the new World Trade Center were taken by me – Amitava Dutta-Roy, Editor.

NOTE: To get to any of the items mentioned in the Contents above please click on the desired item to take you there. To get back to the same place on the Contents page again, please press ALT and the left arrow (<) keys.

## HIGHLIGHTS OF OCTOBER MONITOR



As usual we solicit articles from authors both inside and outside the Sections. Please submit information of the coming events of your chapter/group and reports on the events that have already been held as soon as possible so that there is enough time to edit, fact check and post them in appropriate editions. News items if not published in time become stale.

The highlights of the articles and reviews that we have been promised for the October edition of the Monitor are:

- A paper that describes how ultrasonics and laser beams interact to produce optical imaging that has tremendous possibilities in non-invasive medical diagnosis. The author is Dr. Sankar Sengupta, a former faculty member at Hunter College, CUNY and now an adjunct professor in the department of science and electrical engineering at Fairleigh Dickinson University, Teaneck, NJ. The interesting point of this paper is that Dr. Sengupta worked on this project with a number of high school seniors at the prestigious Riverdale Country School at Bronx, New York. The research equipment as well as the space were funded by Mr. & Mrs. Jerome Falk who contribute regularly to the cause of

research in science & technology. The project is an outstanding example how we can motivate young people who aspire to be scientists or engineers.

- When every stage of our business and profession is tied to inherent costs, have you ever thought of calculating the costs and benefits of interactive information retrieval? Such retrievals can cost you (or your company) quite a bit of money; useful information and its retrieval is no free lunch. The paper would appear to be only of academic interest for the moment. But most things important start with academia and then permeate to the society in general and business (e.g., Adam Smith [1723 – 1790] and John Maynard Keynes [1883 – 1946]). Dr. Leif Azzopardi is a lecturer in computer science at University of Glasgow, UK. In his paper he talks about the economics of information retrieval. His research opens up another corridor of development, how to reduce the price of information retrieval!
- Review of “Ecological Intelligence, Knowing the hidden impacts of what we buy,” by Daniel Goleman. Published in 2009, this book is not new. But it shows the interaction of technology trends, society and the markets, an important topic that is being constantly talked about.
- Reviews of Motorola BlueTooth Roadster (for hand-free phoning), Plantronics BackBeat 903+ (Bluetooth phones), (possibly) Eton Axial hand operated radio that can be used in disaster areas and hopefully in many more situations.

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**Spread the news**  
**Among your**  
**family, friends, colleagues and the community**  
**that we, at the IEEE, are dedicated to advancing**  
**technology for humanity**

## A few words from the editor

September has been a sad month for my wife and me. We moaned the loss of a very dear friend in the tragedy of 9|11. That is why I decided to open my chest and write about how we felt and still feel about the calamity. (I hope that you will read my recollections in the paper following these words.)

Tragedy or no, life goes on. That is perhaps the beauty and harshness of life. The uncertainty of one's existence keeps us going. If we knew how long each of us would be on this planet perhaps all human activities would come to a halt.

Let's now go onto a more hopeful note. You may be interested to know that the Multimedia over Cable Alliance (MoCA), a non-profit technical and trade group that initiated work on standards for home networks appreciated our articles on that topic (Monitor, August 2011) so much that they decided to insert a link from their Website to ours. It is good for us. More people will be directed to our site and more will know that we exist, we do good for our community and we publish. Check it out at [www.moca.org](http://www.moca.org).

**Now you will see a notification about the annual election of IEEE New York Section officers. Read it carefully and please cast your vote. All members of our Section will receive further instructions about the location and voting procedures. Have your voice heard.**

The events sponsored by the Chapters of the IEEE New York Section during the months of August and September are reported under the Section activities. Whenever we did not receive any adverse reports we assumed that everything went smoothly. We then took the contents of the event flyers as guides and wrote reports. Some reports were written by a reporter.

There is also an announcement from the IEEE-USA about an internship for a writer. We have been emphasizing the importance of communication by speaking and writing for engineers. If you are an engineer and meet the criteria of age and academic qualifications stipulated by the IEEE-USA, we urge you to apply for the internship. If the conditions of the internship do not suit you, perhaps you could encourage a friend or a colleague to apply. Do not miss this opportunity.

The reports on the Section activities are followed by a paper on cloud computing. This came about because of my visit to the cloud computing show. I was not sure exactly how to define cloud computing: is it just for data backup and/or apps? Luckily, at the show I met Tom Trainer who is the director of product marketing at Sunnyvale (Calif.)-based Gluster, a company that specializes in cloud computing. I learned that Trainer also writes for a national magazine on network computing. I asked him if he could write a plain story about cloud computing that would remove the doubts many of us have about the technology. In this issue you will see the result of my request. Turner also gave us an introductory video clip. If you wish you could see that clip just by clicking on the button.

In this edition we also publish the third part of “Growing up with the Internet age” by John LeGates, Harvard University. Mr. LeGates gates us through the maze of technology, politics and bureaucracy that still dominate the communications landscape. His is first-hand experience of all of these.

In the history of technology section we publish five photographs taken from an article in which the author **Raoul Drapeau** writes about the technology used by the British to thwart the German bombers during the World War II. Instead of reproducing the entire article here and to encourage readers who may not be able to get the paper from the IEEE we have given a link through which you can easily download it.

At the end, as is customary, we have added informative tidbits that one day may be useful or, at least, entertaining for you.

Thank you for reading “a few words from the editor.” Hope you will enjoy reading the Monitor of September 2011. ██████████



## **The tragedy of 9|11 and us**

### **A personal story**

**Amitava Dutta-Roy**

September 11, 2011! I silently watched the television coverage of the tenth anniversary of the worst massacre in this city’s history. The president came to pay his respect to the 2,753 innocent lives that were lost on that tragic day ten years ago. There was solemn music. Tears were rolling down the grief-stricken faces of the relatives and friends of the fallen. The ritual of calling the victims’ names in an alphabetical order of the last names, A, B, C . . . followed. I listened with my every nerve trained to the announcers’ voices. Slowly but surely one caller came to the letter Y . . . then a photo popped up on the TV screen. It was my friend’s.

In this month we publicly remember the fallen heroes and in this issue of the Monitor I decided to share my personal grief with all of you. All names and places mentioned here are real.

Yes, I had a friend, Jupiter Yambem. My 9/11 story is about Jupiter.

I had known Jupiter for almost twenty years. Though he was much younger we had many things in common. We both liked music and enjoyed the company of people. And we liked to cook. We roamed the Greenwich Village in search of pubs and coffee houses that offered jazz, esoteric foods and heavenly coffee. My work as a consultant required me to travel abroad very frequently almost like a nomad. My transient stays in New York many times overlapped with Jupiter’s whenever I parked myself in the home of my relatives Asoka and Mary Dutt, on Bleeker Street between Perry and 11th right in the middle of the Village. Jupiter was a close friend of Srikant, the only son of the Duttas and a brilliant scholar. Srikant died in a tragic traffic accident. When Jupiter arrived in New York Asoka and Mary embraced him as their son.

My friend was born in far away Imphal, the capital of the state of Manipur, India at the serene foothills of the Himalayas. In 1981 he journeyed to New York in search of better opportunities in life as many of us from that part of the world did those days. Jupiter sustained himself doing some odd jobs and then decided to study economics at the State University of New York (SUNY)'s New Paltz campus. There he met Nancy, a charming and like-minded lady from Syracuse. She was studying music therapy at the same campus. The inevitable happened. They fell in love and got married soon after their graduation. I had the privilege of attending their wedding. The couple moved to a nice home in a peaceful neighborhood of Beacon, Dutchess County, NY.

Jupiter entered into a career in hospitality services as the maître d' the Rainbow Room on the top of 30 Rockefeller Plaza, midtown Manhattan, a very demanding job. His bosses and colleagues admired him for his gentle demeanor and velvety bass voice. I know this to be true. Jupiter liked the peaceful ambiance of Beacon so much that he commuted everyday between his home and Manhattan though up and down trips left with him less time for his other activities. Nancy, besides her own work, got much involved with helping the local community and the church. No wonder the couple won friendship and praise from their neighbors. Jupiter also befriended Pete Seeger, the doyen of American folk music. Both Nancy and Jupiter along with Mr. Seeger and other members of Beacon Sloop Club were involved in organizing the Cold Spring Shad festivals. If you have been to one of those you know how enjoyable these fests were.

Nancy gave birth to a baby son and they fittingly named him Santi (meaning peace in Sanskrit).



Jupiter, Santi and Nancy

Fast forward to 1990! I got a consulting assignment from the International Telecommunication Union (ITU) which stipulated that I stay in New York for longer periods between my travels, no more transient free parking. I then decided to move to the far eastern end of Queens, an area kinder to my pocket. Who helped to me to carry my belongings? It was Jupiter, my good friend. He even lent me his car for a few days. He was always ready to extend a helping hand to those who needed it.

At the end of 1999 I married. Soon my Brazilian-born wife joined me in New York. Jupiter and I kept in touch by phoning each other. In the meantime, Jupiter climbed higher in his profession. He joined the Windows of the World restaurant located at the giddy heights of the 2 World Trade Center, the North Tower as its banquet manager. There he had the responsibility of managing serious meetings (with food, naturally) and revelries of huge companies, mostly located around Wall Street.

Fast forward again! To September, 2001!! On Monday, the 4th I got a phone call from Jupiter.

J: Hello, Amit, how are you doing?

A: We are fine, thanks for calling. Long time no see Jupiter, how are you? . . .

. . . . .

J: I was wondering if you are free on Friday next (9/7). If you are, I would like to invite you and your wife (Cristina) to dinner at this restaurant. Nancy will also join us.

A: thanks, Jupiter for your invitation. Surely, we'll make ourselves free for you.

J: By the way, Amit, has your wife got a job yet? What is her profession?

A: No, Jupiter, Cristina has not got a decent job yet. She is still looking for one.

J: You told me earlier that Cristina was trained in law and accountancy in Brazil. At the restaurant we need a full-time internal accountant. I think that she could do a good job. Do you think Cristina will be interested? The money is pretty good. Please ask her to bring her resume when you come to the dinner on Friday. Though I can recommend her I'll have to show the resume to our HR department before she gets hired.

A: Thanks, Jupiter . . . .

Both my wife and I were excited that there was a real possibility of her getting a job. (That would be her first regular job in this country.) And we both loved the atmosphere and the shopping plaza of the old WTC and the World Financial Center across the highway. What could be better than getting a job at the Windows of the World? And we both knew that we could rely on Jupiter's guiding hands.

Friday, September 7, 2001. The phone rings in the morning. It was Jupiter once more.

J: Hello, Amit, remember our date for this evening?

A: Sure, Jupiter. When do you want us to arrive there?

J: Amit, do you think that we could postpone our dinner to eleventh? This afternoon I plan to spend some time with my son Santi who had his first day of his school on day before yesterday. Do you mind?

A: No problem, Jupiter, we'll see you on Tuesday. . . . Bye.

The evening and the night of Monday, September 10 was incredibly hot. We slept with the air-conditioner working at full blast. The door from the bedroom closed to keep the room cool. The phone was in my little home-office.

We both used to get up late during those days. My wife had no regular job to go to. And I always love to be a night owl. The whine of the air-conditioners was pretty loud. So, none of us perceived that the phone in my office rang many times. When I realized that somebody was trying to call us it was past 10 in the morning. I rushed to the phone. It was my sister-in-law Marylene from Brazil calling us.

M: Amit, where were you? I have been trying to call you for more than half hour. Is Cristina in the restaurant in the WTC?

A: No, Marylene, Cristina is here. We'll go to the WTC this evening to meet with Jupiter and Nancy.

M: You don't have to go to the WTC because that does not exist anymore.

A: What do you mean does not exist? I was there last week.

M: Don't you watch television?

A: Television in the morning, are you crazy? We have work to do.

M: Watch the TV.

We switched on the TV. There is no signal on the ABC off-the air channel, only snow. We switched to other channels, the same thing. How would we know that the antennas of most TV stations serving metropolitan area were on the top of the WTC and all of them were dead? Finally, we got one station with faint signals but now I cannot remember which station. (Later, I discovered that the antenna of that station was somewhere in NJ). The gory scenes were so horrible that I was simply mesmerized.

Then it dawned on Cristina that we had a dinner with Jupiter that same evening. Where is Jupiter? I called Nancy. The phone rang and rang and nobody picked up. I started to sweat. I was under the impression Jupiter's work always started rather late in the mornings. May be, he is saved, I thought. Suddenly, I remembered that we had a common friend. Jupiter was very close to him.

I decided to call Nandan Barua, a common friend.

A: Good morning, Nandan, this is Amit. Do you anything about Jupiter? I called Nancy but did not get any answer to the phone call. I know that Jupiter goes to the WTC late in the morning.

N: Yes, Amit, I spoke with Jupiter this morning at 7.30. He was there to supervise the breakfast conference on risk management that was being attended by many Wall Street types. He told me that the organizers were the restaurant's important clients and he was there to make sure that everything was perfect.

A: You mean to say that Jupiter was inside the Windows of the World when the North Tower collapsed?

N: Yes, I believe that Jupiter was there.

Silence from both sides. My telephone call to Nandan ended.

For the next two days we practically forgot to eat and did not sleep much either. We were glued to the only off-the air TV channel available in the city and we were making frequent calls to all friends to inquire if there was any news of Jupiter. Jupiter was 41.

The bits of news we got from the only TV station that eight aircrafts were hijacked and only four had been identified. We thought that then four were still in the air and could attack us anytime.

By Wednesday my wife who was not yet so much habituated with the New York life wanted to leave the city. I called a friend who lived in Bridgehampton in Long Island if we could go there for a few days. Srinanda, my friend was generous and invited us to their home. Even at Bridgehampton our phone calls to our common friends continued.

Saturday evening! Nandan called and gave me the news that the authorities in charge of the cleaning up of the worst massacre in this city's history informed Nancy that some remains of Jupiter were found and identified. They would be returned to Nancy on Friday.

On Monday (9/17) afternoon we gathered in the Jane Street home of Viren and Amita Mehta who were also our common friends. The ladies – Amita, Jane, Yoko (Nandan's wife) and Cristina — gave their feminine touch in arranging so beautifully the flowers in the form of bouquets and wreaths. But from the twelfth floor of the Jane Street apartment, if facing south, we could still see the black smoke and dust billowing from the hollow where the WTC once stood so majestically. It reminded all of us again and again what had happened three days earlier and that atrocities know no limits. The stench wafted in our direction.

In the meantime, in Beacon Jupiter's remains were handed over to Nancy.

On the following day all relatives and friends of Jupiter who were here in the New York area gathered together at his home in Beacon. I was surprised at the smallness of the casket that hid his body. I'll never know how the end came and why the casket was so small. But does it matter? Nancy is a bold lady. She faced the reality of life and the truth.

Nancy desired a simple funeral in the presence of just a handful of friends. Following the Hindu rites Jupiter's remains were cremated at the Town of Newburgh. It was so touching to see little 5-year old Santi putting his tiny hands on the casket to say goodbye to his father (also a Hindu ritual!). Jupiter's elder brother Angamba came from Imphal and carried the ashes to India.

A few weeks later we were on our way to Beacon to attend a memorial service to remember Jupiter. I never liked to drive along the Cross Bronx Parkway. I decided to cross over to Manhattan and then get to Hudson River Parkway. But several times we got stuck in traffic bottlenecks. We had forgotten that it was the day of the New York Marathon, Sunday, November 4, 2001.

The service was held in Beacon River Front Park on the bank of the river Hudson. Jupiter's old friend Pete Seeger came to pay tribute to his old friend through his songs, naturally ... so touching and soulful music.



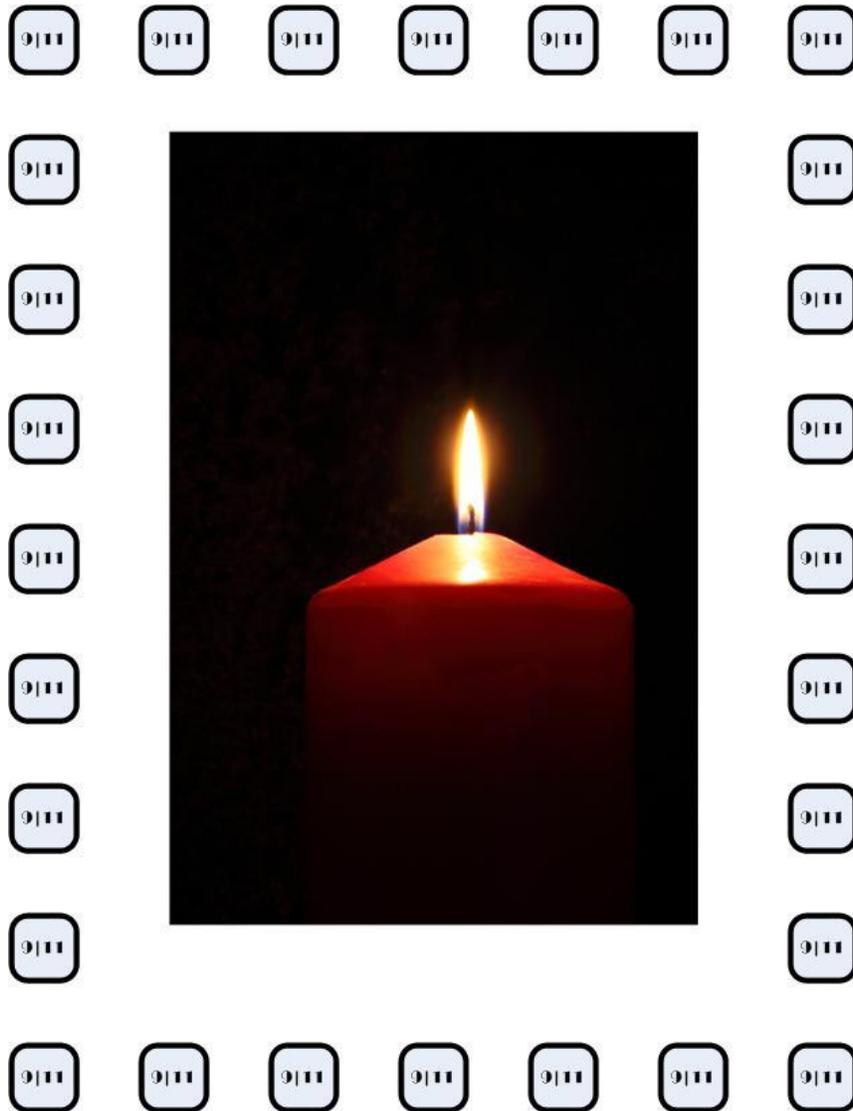
Jupiter Yambem's son Santi at the Reflecting Pool, WTC

I still vividly remember the rose petals we threw in the water and the candles floated in the river.

Nancy is a brave lady. She faced the realities and has continued with her life and what it entails. She immersed herself in more community work. Santi is now 15 and growing up to be a fine young man. His academic records are good; he plays guitar, skateboards and wrestles for the school.

I wonder if the attendees at the risk management breakfast inside the Windows of the World on 9|11 could even imagine the grave risks they were taking personally.

A friend for ever lost in a tragedy caused by lunatics . . . lost somewhere in the universe . . . but never forgotten. Jupiter, we miss you and we will keep the candle lit for you and all others who went with you!!!



## **Notification of Annual Election of the IEEE New York Section, 2011**

In accordance with its by-Laws, the IEEE New York (NY) Section is advising all IEEE NY Section members that an election for officers and certain working activity committee chair positions for calendar year 2012 will be held on November 15, 2011. The time and location of the election meeting will be announced shortly.



Chair: Mrs. Darlene Rivera  
794 Barberry Road  
Yorktown Heights, NY 10598

Secretary: Mr. Michael Haroutunian  
199-36 19<sup>th</sup> Avenue  
Whitestone, NY 11357

If you have any questions regarding this notification, please contact Mr. David Horn, Chair – NY Section Nominating Committee, via e-mail ([pastieechairny@gmail.com](mailto:pastieechairny@gmail.com)) or by telephone (212.878.4781).

The logo consists of the letters 'I E E E E' in a stylized, blue, outlined font. The 'I' is a vertical bar, and the 'E's are block letters with a slight shadow effect.

**Formed by engineers,**

**run by engineers and meant for engineers**

**Annual election, New York Section, 2011**

**Cast your vote and let your voice be heard**

**Election will be held on November 15**

**Watch out for the time and place**



## Section activities during August and September, 2011

### August 23: PES/IAS/LMAG presentation

#### The evolution of standards, past, present and the future by Ken Krechmer

We are all engineers connected with the electrical, electronic and computer industries. We traditionally use the meter-kilogram-seconds system in our calculations though in this country we use inches, feet and miles for many engineering measurements. The IEEE has a big department working on standards, both for power engineering and electronics and communications. Incidentally, have you ever inquired how one foot came to be called one foot?

Enter Ken Krechmer is a senior member of the IEEE, a lecturer at the University of

Colorado and an expert on standards. His interest in standards is two-pronged, both professional and academic. On August 23 Krechmer gave a talk, jointly sponsored by PES/IAS/LMAG, to a group of people eager for knowledge that lies beyond their normal professional interests. In his talk Krechmer said that in each wave of civilization entrepreneurs created wealth while each society worked to redistribute that wealth, in part by creating standards. The development of



agriculture, which required standard measures of land and produce, moved civilization from a hunter-gatherer society to a wealthier agrarian society. The development of manufacturing, which produced standardized products, created enormous wealth during the industrial revolution. The information age with its computer and communications entrepreneurs is built on standardized compatibility (i.e., cellular, IEEE 802.11.xx, WiFi, DSL, DOCSIS, etc.). Each new wave of technology requires new standards to widely distribute the benefits of that technology. Krechmer offered his long-term vision how the balance between the needs of the entrepreneurs and the needs of society in the post-information age may be better resolved. New forms of standards will be identified which can offer the entrepreneurs opportunities to increase profit without limiting a technology's value to society.

	Age				
	Hunter Gatherer (before 3000 BC)	Agrarian (3000 BC - 1750 AD)	Industrial (1750 - 1950)	Information (1950- 2000)	Post-Information (after 2000)
<b>Standards succession</b>	Symbols	Measurement	Similarity	Compatibility	Adaptability
<b>Authorities' involvement in standardization</b>	Dominate	Authoritarian	Oversight	Limited or none	Future: Guidelines?
<b>Entrepreneurs' view of standards</b>	Unknown	Undesirable	Distrustful	Winner-take-all	Future: Fair?
<b>Economic self-reinforcing mechanisms</b>	Communications	Coordination effects	Scaling and learning effects	Network effects	Gateway effects

The slide around which Ken Krechmer based his talk of August 23

Krechmer explained the origins of measurements and standards. The concept of measurement started when the king or the state wanted to tax the assets the citizens amassed by sheer hard work or through inheritance. How does one measure the area taken up by a millionaire or a gallon of beer? How should the state tax its citizens to keep the wheels of the society running? Sure, we all know the answers by now. The 1040 form of the US IRS gives us examples of measures (money, land area and time etc.).

It was a very interesting talk followed by a vigorous Q&A session.



So, what happened to the measurement of a foot we are so accustomed to? Apparently, it was the length of the feet of King Henry I (1069 – 1135). Wikipedia offers other roots as well.

Note: Ken Krechmer's talk was based on the prize-winning paper he wrote: "The Entrepreneur and Standards" that was originally submitted to the International Electrotechnical Commission (IEC) as part of the IEC Centenary Challenge 2006, organized in association with "The Economist", and in partnership with the IEEE, the IET and VDE. This paper received the joint second prize on December 14, 2006. It has been published in International Standardization as a Strategic Tool: Commended Papers from the IEC Centenary Challenge 2006, p. 143-154. Geneva, Switzerland: International Electrotechnical Commission. It is copyright by the IEC, Geneva, Switzerland. All rights reserved. It is reproduced here with their permission. Further information on the IEC and the IEC Centenary Challenge is available from [www.iec.ch](http://www.iec.ch). We will show you another faster way to read the paper. Just go to >> <http://sites.ieee.org/ny-monitor/files/2011/09/IECChallenge20062.pdf> . . . — Reported by Amitava Dutta-Roy

## September 16, 2011, Friday: PES/IAS Outing

Would you believe that the roots of Power & Energy Society (PES) and the Industrial Applications Society or IAS (as both are known today) of the IEEE go back to 1929? Power engineering was the real electrical engineering those days. Electronics and related technologies existed only in the minds of academic researchers and tinkerers. Happily, PES and IAS are still alive and kicking, and probably the two strongest in the entire IEEE organization. In the New York Section they, jointly with the Life Members Affinity Group (LMAG), organize, at a minimum, one presentation every month, on the last Tuesday of the month, rain or shine. All three Chapters, in a most befitting convivial manner, share the efforts of scouting for good speakers, composing the flier layout and distributing them in places of work. Their volunteers put in many hours in ordering pizzas and soft drinks before the lectures start. After the events they clean up the customary venue, the Edison Room on 19th floor of the ConEd building on Irving Place. (I know this first hand, since I have been the chair of the LMAG for the last three years and have actively participated in the events.) The monthly presentations cover a wide range of topics, from use of software in music composition, to building a substation, to corrosion issues in electrical industry, and to computers in fashion industry. The list has grown long. Each attendee of these presentations is eligible, at a nominal cost, for earning two Professional Development Hours (PDH) accredited by the IEEE. Apart from the monthly presentations the PES/IAS also organizes conferences and offers courses.

One year, at least three decades ago, the committee members of the PES and IAS thought to organize a Fall Outing when the volunteers could network, enjoy the outdoor and have some fun. It was somewhere far from the bustling New York city. The principal purpose of this Outing was to thank and honor the committee members and volunteers who during the entire year unflinchingly gave their time to the two Chapters. Soon holding an Outing event became a tradition with the PES/IAS. This year too, like in the recent past, the event was held at Krucker's Restaurant and Grove in lovely surroundings of Ladentown, NY, just off the Palisades Parkway (Call Hallow Road, Exit 13). (If you are thinking of arranging an Outing for your club or community think of the place.)



Some fifty people from the PES/IAS from the tri-state area came to the event on a beautiful balmy fall afternoon. Sizzling hamburgers with their accompaniments, bocktwurst, bratwurst, clams and shrimps provided the mouth-watering starters and the gourmets were even offered two kinds of beer on the tap.

Anyone ready for a little bit of fresh air and exercise before you head towards a sit-down dinner? Bocce, horseshoes, softball and volleyball? As expected most of the desk-, laptop-, cell phone- and FaceBook-bound *players* were not in form. (See the photographs on the Anchor page.) But it was fun, good innocent fun.

A sumptuous dinner followed. You can even see a plateful of lobster in the photograph. As if these were not sufficient, the organizers gave away some prizes. Everybody got something. Wow! In short, we had a wonderful time, thanks to the present and future chairs of PES/IAS and volunteers. Keep the tradition going. We'll be back to the future events. **Join the IEEE and PES/IAS (if they happen to be your specialization) and do some volunteer work.** You will earn an invitation to the next year's Outing.

## September 19, 2011, Monday: EDS and SSCS Meeting

**Topic:** "Silicon Monolithic MEMS + Photonic Systems"

Dr. Sunil Bhave, Assoc. Prof. at Cornell University spoke about Optomechanical systems offer some of the most sensitive methods for detecting mechanical motion. The systems take advantages of the shifts in the optical resonance frequency of optomechanical resonators for that purpose. Though electrostatic capacitive actuation and detection offers the main transduction scheme used in RF MEMS resonators, presently, the optomechanical systems are employed in measurement of mechanical thermal noise displacement or mechanical motion brought about by optical forces. The use of electrostatics is convenient as it allows direct integration with electronics used for processing the RF signals. Dr. Bhave spoke about a method for actuating an optomechanical resonator by electrostatic forces and sensing of mechanical motion by utilizing optical intensity modulation at the output of an optomechanical resonator, integrated into a monolithic system fabricated on a silicon-on-insulator (SOI) platform. He also discussed the new applications those are enabled by this hybrid system that includes Opto-Acoustic Oscillators (OAO) and Optomechanical Gyroscopes (OMG).

This report was adapted from the pre-event flier.

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## September 21, 2011, Wednesday: a PACE presentation

### Living Your Way: Planning for Income in Retirement

With retirement not too far off, do you see it primarily as a time to relax, travel, further your education, start a business or spend time with your family? More importantly, will you have the income you need to afford the kind of retirement you envision? Drawing on the resources and intellectual capital of a global investment firm, Joseph Soranno, CRPC, Financial Advisor of Rose and Soranno Wealth Management Group, explained how you can create a retirement income game plan that incorporates sound investment strategies, current retirement realities and the equally important idea as to what retirement means to you.



- Why is retirement income planning important?
- How much will you need to retire comfortably?

It seemed that the small group gathered in the meeting was really interested in the topic and energetic discussion followed the presentation.

This reporter (the Monitor editor) pointed out that the self-inflicted or company-mandated retirement age should not affect the life of an individual. You may be retired from a company where you worked for years. But if you feel healthy and feel happy with challenging work, go for it. Do some mentoring of young students on behalf of the IEEE. That will keep your brain active and consequently your body in

shape. This has been medically and statistically proven. If you work as a freelance consultant continue to do so. After all, we all want to be happy at any age with whatever we feel comfortable with.

—Reported by Amitava Dutta-Roy

## Technology Management Council Update

The Technology Management Council (TMC) plans to initiate its 2011/12 season on October 24, 2011 with an event that will be co-sponsored by the Communications Society Chapter. Stay tuned for details.

In November TMC intends to hold its second meeting to discuss other topics and to plan future meetings. The November meeting will be held either over lunch or at 5pm. Those who are interested please contact me at [daweiss@ieee.org](mailto:daweiss@ieee.org).

One topic that is particularly timely is how best both companies and individuals can maintain their competitive skills in the face of an uncertain economy. Management, employees, and educational institutions each have their own perspectives on the situation and on courses of action.

There are many options to staying competitive in your own field or even in a new field. Continuing education for helping professionals to stay competitive ranges from hour long seminars to degree programs and everything in between. What are the advantages of each course? We'd like to bring together senior executives, professionals, and college educators to discuss and share perspectives.

**Please let David Weiss, Chair, Technology Management Chapter at the New York Section (at the above e-mail address) know about your interest and availability!** [REDACTED]

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## Cloud computing

**Where is this cloud? Not your cumulus nimbus!**

Tom Trainer\*



*[Editor's note: The author has provided the Monitor with an introductory video clip. To see and hear that clip please go to>> <http://sites.ieee.org/ny-monitor/?p=988&preview=true>.*

## Abstract

In general, cloud computing is still not very well understood by information technology professionals and even less so by business executive management - who may stand to gain significant competitive advantage by leveraging cloud computing and services. In this article we will outline today's definition of cloud computing, common types of clouds, the benefits derived from cloud computing, the technologies which accelerate cloud computing adoption by traditional enterprise data centers, and thoughts on where we go from here with the cloud. Additionally, the article will discuss if the cloud should be catering to data, applications or both.

## So, what is Cloud Computing?

"Cloud computing" is one of the industry's most frequently used, even abused, buzz words and probably something you hear all the time. From IT Managers to Microsoft's latest "[to the cloud](#)" commercials, cloud computing is on the tip of everyone's tongue. Recent analyst reports and tales of successful cloud deployments are showing that the cloud is here to stay. A report contracted by a major analyst research firm stated that the global cloud computing market will grow from \$40.7 billion in 2011 to more than \$241 billion in 2020.



But the question that still remains on many people's minds is, "what is exactly cloud computing?" Cloud computing refers to the delivery of computing as a service rather than a tangible product, over a network, typically the Internet. Many familiar examples would be companies like Google and its Google Docs service or online file sharing companies like Box.net. Communication or storing photos in a social network site would

also be considered cloud computing and a common phenomenon as Facebook (one of many social network sites, and part of the cloud) boasts over 750 million users.

Cloud Computing is divided into private, public and hybrid clouds and further divided into three categories: Infrastructure-as-a-Service (**IaaS**), Platform-as-a-Service (**PaaS**) and Software-as-a-Service (**SaaS**). Users have the flexibility to customize their clouds for maximum utilization of their money which is one of the main benefits of cloud computing.

## Private Clouds

Private clouds are a proprietary network or a data center that supplies hosted services to a limited number of people. Private clouds are completely customizable and are operated solely for a single organization, whether managed internally or by a third-party and hosted internally. Security is controlled internally behind a company's firewall so administrators can monitor who is going in and out.

Private clouds offer a great option to organizations that are still nervous about moving their existing and traditional infrastructure to the cloud and giving up control over part of that infrastructure. A recent analyst report stated the market for virtual private cloud solutions will grow from \$7.5 billion in 2011 to \$55.4 billion in 2020.

Security is also a big concern for enterprises that may be considering the use of public cloud. For such organizations the private cloud represents an alternative with a tighter security model that would enable their IT managers to control the building, deployment and management of those privately-owned (internal) clouds.

However, even with this amount of control the private cloud faces much criticism for not delivering much up-front savings on capital costs and for demanding a lot more hands-on management, both of which are the most intriguing concepts about cloud computing. It should be noted that innovations in security measures for the public cloud are being released by recognized IT security providers and security in the public cloud will become less of a concern over the next few years.

## Public Clouds



If you aren't a “full commitment” type of person and like to test the waters, then perhaps the private cloud isn't the right choice for you, or your organization. Private cloud definitely requires a full-time commitment. Not to worry, another option is there for you: public cloud computing.

Public cloud services are often offered over the Internet by an off-site third-party provider who bills on a utility computing basis – or pay for what you need when you need it. Currently, Amazon Web Services is the largest public cloud provider but there are a few other up and coming companies looking to take some of the market share away from Amazon. Public cloud computing environments are easy and inexpensive to set-up because hardware, application and bandwidth costs are covered by the provider and you do not waste resources because you only pay for what you use.

Again, every good feature is burdened with some drawback. Because the public cloud is not managed internally but provided by outside parties, security is a big concern and is a key reason why more organizations are not using the public cloud in their current environment. As previously mentioned, innovations in security measures for the public cloud are being released by notable IT security providers as well as network specialists such as Riverbed Technologies and security in the public cloud will become less of a concern over the next few years. If you are considering using the public cloud for your department, or business, you should speak with a public cloud provider about their security measures and offerings.



## Hybrid Clouds

Sometimes a cookie cutter, black or white, public versus private, is not what your company needs and the solution is creation of a hybrid cloud. A hybrid cloud is a composition of at least one private cloud and at least one public cloud and is typically offered in one of two ways: an organization has a private cloud and forms a partnership with a public cloud provider, or a public cloud provider forms a partnership with an organization that provides private cloud platforms (i.e., an existing commercial company, or specific cloud platform vendor).

As companies and organizations are beginning to see the benefits of both public and private clouds, this new hybrid computing is an extremely attractive option. This is especially true as new and innovative cloud storage and applications are brought to market.

## The Benefits of Cloud Computing

Today it's common for businesses and organizations to keep costs down as much as possible – in most companies it is crucial. One of the major attractions of cloud computing is its cost savings. First, in terms of the usage-based pricing it ensures organizations are only paying for what is being used and nothing more. Wastefulness is not an option. Second, specifically with public cloud computing, it requires fewer IT skills for implementation, meaning it's fairly easy to implement public cloud services.

Customization is also a huge benefit, especially with the private cloud. While it may require more resources in terms of man power and costs, it allows organizations to pick and choose which solution best fits their business needs and current environment. Essentially, giving you more control. This leads me to my next topic.

How much control do you want? In your own private cloud you will be able to control every aspect of your infrastructure. However, this vast amount of control can come at a price. You must consider the price of required manpower and unique skill sets as well as managing all of the physical aspects such as planning of power consumption and cooling and on-going administration.

If you can relinquish some control and are satisfied with the security measures implemented by your public cloud provider, then you can begin to realize some of the benefits of the utility aspects of public cloud computing. Granted, there is some loss of control of the physical aspect of the IT infrastructure; however, public cloud providers will supply service level agreements which are based on the type of availability of resources you require.

## Should the cloud cater to data, applications, or both?

In the private cloud it has been easier to cater to both data and applications; keeping the issues concerning security, applications, and data access at the forefront of planning, administrators have been able to build private clouds which can accommodate for the needs of all aspects and requirements of the private cloud. Of course all of this comes at a steep price; however, the private cloud has been able to cater very well for data and applications.

On the other hand, the public cloud has had a rough start catering to both data and applications. This is primarily due to security concerns as well as network latency issues associated with public cloud data ingest, the processing, and data outflow which have been notorious for crippling application performance. It has been relatively recent (2011) that wide area network (WAN) accelerators and other public cloud latency reducing technologies such as high performance network attached storage (NAS) for the public cloud have decreased latency to a point where real-time applications are now viable and the public cloud can be used for more than a bulk repository for data backup. These performance enhancements, coupled with advances in security, make the public cloud a much more viable option for many global business enterprises.

Today, some companies are building hybrid clouds and leveraging the benefits of both private and public cloud – essentially, combining the best of both worlds. An example of this concept is where a traditional data center/private cloud environment finds it faster to develop new solutions for their customers in the public cloud, yet still realizes the many benefits and the need for a private cloud within their company.

The cloud, whether it be public, or private, will undoubtedly continue to cater to both data and applications.

### **Technologies which enable and accelerate cloud adoption by traditional enterprises**

There are many technologies available today which enable cloud adoption; however, there are a few which have been key to accelerating cloud adoption by traditional enterprise computing organizations. These technologies include:

- Advanced server software
- WAN acceleration
- NAS in the cloud
- Thin client and mobile apps

Advanced server software which provides server virtualization has been a cornerstone of many private and public cloud deployments. Companies such as VMware, Citrix, and Red Hat have provided operating systems which enable large scale server virtualization (consolidating many physical servers into one virtual server). These virtualized operating systems, called hypervisors, support running of many applications in a virtual machine environment. Some, who have familiarity with the IBM mainframe environment, may remember IBM's Virtual Machine (VM) offerings from the 1970's and 80's. Today's VM concept is not too far afield from the older mainframe approach – it's simply deployed on more cost effective commodity server hardware. Today, VMware's ESX, Citrix's Xen, and Red Hat's KVM hypervisors are the most popular – with Microsoft's Hyper-V quickly catching up and gaining ground on the three current leaders.

WAN acceleration has been the key in reducing troublesome IP network latency and accelerating cloud adoption. Moving data and running applications across IP has been notoriously troublesome for all early adopters of cloud services and technologies. With WAN acceleration technology from companies such as Riverbed Technology, data centers and remote application processing locations can now run applications and deliver data at a much faster rate thereby greatly reducing latency and improving application and user response times.

NAS in the cloud has been another innovative technology which has accelerated cloud adoption by traditional enterprises. By being able to deploy scalable files and object storage within the public cloud, enterprises are now able to run their file-based applications in the cloud, achieving performance and service levels only possible in the data center in years past. Such advances in technologies enable businesses to move product developments to the cloud and shorten innovation and development cycle times, bringing new products to customers faster and well within very narrow market windows.

The use of mobile devices has certainly skyrocketed over the past five to ten years. A couple of the drivers behind this increase have been the easy deployment of thin clients, as well as quickly developed and deployed mobile apps. At the backend, private and public clouds support this growth with virtualized servers, network data traffic accelerators, innovative data storage, and development tools which enable this growth to continue – nearly unabated.

### Where Do We Go From Here?

One of the keys to understanding is knowledge about cloud computing. It has become imperative that you take time and grasp the concepts of cloud computing and various sub-components of the infrastructure and technology involved. Your job, business, professional organizations, affiliations and even your personal computing may depend upon just how well you understand the cloud and how best you can leverage it.



Business managers must now recognize the viability of cloud computing as a way to trim infrastructure costs, reduce development time, and increase competitiveness in a highly-competitive global market. Development engineers should understand the concepts and facilities available to them in order to enhance their skill sets and blend into the emerging cloud technology and development communities more easily – essentially ‘cloudifying’ your skills.

With network performance concerns for storage and basic data transfer speeds resolved, innovators will now focus on eliminating remaining hard-to-solve security issues. By 2015, public cloud computing surely will be more secure and resistant to network attacks by nefarious clandestine operatives.

As more organizations consider and deploy enterprise-class commercial private and public clouds, they will eagerly consider and deploy open source alternatives such as OpenStack (<http://www.openstack.org/>) in order to maintain even tighter cost controls and freedom of choice of cloud stack components.

### Summary

This article has provided merely an overview of the types of clouds, their benefits and challenges, as well as discuss technologies which accelerate cloud adoption. Obviously as cloud computing evolves these elements will also change, but one thing will remain consistent - cloud computing is the future.

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\*Tom Trainer is the Director of Product Marketing at Gluster. Prior to Gluster, Tom had executive and managerial positions at Analytico, EMC, Hitachi Data Systems, Auspex and Memorex-Telex. His responsibilities have run the gamut, from engineering, to product management, competitive analysis, to sales and marketing. Tom is known for his unique ability to take highly complex topics and explain them in terms that are easier to understand. Additionally, Tom enjoys explaining the business value of technology products, their features and functions, and value proposition they bring to the business environment. ██████████

### **More notes from the editor:**

The topic of cloud computing is now so important that the IEEE-USA reports from the Capitol Hill the following.

#### **CAPITOL HILL**

Subcommittee Examines Cloud Computing's Role in U.S. Innovation, Competitiveness - The Subcommittee on Technology and Innovation held a hearing to examine the potential opportunities and challenges associated with cloud computing, and to assess the appropriate role of the Federal Government in the cloud computing enterprise.

For a complete press coverage of the topic please go to [www.ieee-USA.org](http://www.ieee-USA.org) and look for IEEE-USA - Eye On Washington, Vol. 2011, No. 12 (26 September 2011).

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## **Growing up with the Information Age**

### **John LeGates**

In the following we publish the Part III the article by Harvard University PIRP's John LeGates. (The copy of the article reproduced here is as it appears at PIRP and is unedited by us.) It is fascinating to read his encounters with the legendary figures' of the Internet and his involvement in the process. The URL of Harvard University is [www.harvard.edu](http://www.harvard.edu) and that of the Program for Information Resources Policy: [www.pirp.harvard.edu](http://www.pirp.harvard.edu).

*INCIDENTAL PAPER*

Growing Up With the Information Age

John C. B. LeGates  
April 2011

## ***Program on Information Resources Policy***



*Center for Information Policy Research*



*Harvard University*

The Program on Information Resources Policy is jointly sponsored by Harvard University and the Center for Information Policy Research.

*Chairman*  
Anthony G. Oettinger

*Managing Director*  
John C. B. LeGates

John LeGates began his career as an entrepreneur in the earliest days of computer communications and networking. He was the first to put computers in schools and later in hospitals. He built the first academic computer-resource-sharing network and was a member of the Arpanet NWG, the original Internet design team. Since 1973 he has been a member of the Harvard faculty, where he co-founded the Program on Information Resources Policy.

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## **GROWING UP WITH THE INFORMATION AGE**

### **PART III**

**John C. B. LeGates**

**EDUCOM TO . . . .**

**Harvard 1973 -**

I was not motivated to leave EDUCOM by a need to grow into something new, but here was an opportunity to work with an empty easel. I took some time to look around and think through what to do next. In the end I came up with two choices: both of my own creating.

One grew out of my lifelong interest in the natural environment. Because it's never quite been my profession, it's always been active as a hobby.

I do not usually have pivotal flashes of insight, but one played a role in this option. I was turning over the idea that conservation, to work in the long run, had to be profitable. I suddenly saw garbage from a new angle: instead of stuff to throw away, perhaps it could be considered stuff to mine for valuables. I started checking out the technology, which was under development as bits and pieces; and the economics, which was obviously hypothetical. I visited and interviewed several places where parts of the problem were being addressed.

I particularly enjoyed a couple of days with Sunset Scavengers in San Francisco. They were a beautifully-run municipal waste outfit that separated glass and metals for sale before reducing the rest to a usable slurry. It was an 100% Italian-American company based with pride on "garbage was so low that nobody would touch it but the lowest immigrant group - we Italians." I walked in the door with no introduction or credentials, and they treated me with the warmest of hospitality. Maybe it was because I would only compete 3000 miles away and maybe they were just pleased to see someone show an interest in garbage - anyway their generosity was marvelous.

I put together a draft prospectus and built up the political connections to set up a next-generation counterpart in eastern Massachusetts. I got the promise of for-profit investment money. But when the time came, I chose the other option.

My urge to "understand how things work (and make something happen)" was developing yet another dimension. I was becoming convinced that the benefits of technology were not merely determined by better technology, as I had previously assumed. Instead the heavy factors had to do with how society itself worked. What made companies choose and promote a technology? How were government regulations and initiatives formed, and did they help or hurt? How much was being shaped by current or traditional habits and ways of getting things done? Why was there "risk money" for some ventures and not others? Why did AT&T twice turn down the Internet?

I was talking these ideas over with James McKenney, a friend who was also a professor at Harvard Business School. He said "There is someone you should meet. You two came to the same crossroads, even though you got there on different roads. His name is Anthony Oettinger."

Oettinger had come to the crossroads this way: He had been the founding Chairman of the National Academy of Sciences Computer Science and Engineering Board. After a year, he concluded that the funders of the Board could dictate the outcome of its work, destroying its impartiality. In response he closed the Board, returned the money, and resigned from the Academy. He returned to his office at Harvard pondering: "if the Academy can't provide impartial, competent advice, how can it be done?"

Official notice, warning, disclaimer and claimer From this point on, Tony and I have enjoyed a fusion of our careers. We bill ourselves as interchangeable. I cannot disentangle "my" accomplishments from "our" accomplishments. He routinely says the same. I will continue to use the word "I", but I sometimes mean "we", and almost always "I in a context created by us". If there is such a thing as dedicating a story like this to someone, then I wish to offer this one as a contribution to Tony's upcoming career-and-70<sup>th</sup>-birthday celebration.

I don't mean that we do everything together. We each take extensive business trips alone, for example, and we have never co-authored anything.

We get frequent remarks on our obvious personal differences. My style could be called British/Yankee reserve; his Mediterranean verve. I am cool-tempered, he is emotional. I am understated, he is dramatic. I am best at finding the central point, he at elaborating the implications and details. I speak as simply and with as few words as I can. Tony's speech blossoms with images, similes and metaphors, and can be wordy. My desk is neat, his covered with piles. People respond to us differently and hear what we say differently.

How do we cope with our differences? It's simple - we exploit them. If we're both present with someone, and they don't like or can't understand one of us, the chances are pretty good that they can work with the other. Our minds work so differently that we each come up with ideas the other wouldn't conceive. This happens every day, even after twenty-five years. We act as checks on each others' excesses.

So what are our "accomplishments", and why are they worth reading about? First we invented a whole new method for bringing intellectual integrity to bear on strategic decisions. This was why I chose Harvard over the for-profit option. We work specifically with the communications/information world, but our techniques may also apply to other environments full of conflict, confusion and change. Second we have worked personally and corporately with almost every major player shaping the information age. We have heard everyone's story and helped them form their strategies. We have been uniquely positioned to understand the inner workings that got us to where we are.

A few success samples: We have helped every White House since we formed our Program. We have spent time with both houses of Congress, all fifty state utility commissions and perhaps thirty foreign countries. We were recently told by a telephone company that "use of your map (one of our Program's planning tools) has created twenty billion dollars in value for us." Of the same map, we have been told that at least half of the Fortune 100 information/communications companies have used it as the centerpiece of their thinking process. We wrote the keynote article for the centennial issue of Science. We played a central role in the military reorganization of 1986 (The Goldwater-Nichols Act). We have appeared on all three of the national network morning television shows and All Things Considered. Articles about us or featuring our thought, have appeared in Fortune, Newsweek, The Wall Street Journal, The New York Times, and elsewhere. We got a nice recent compliment from a senior Senate staffer. He called to get another copy of one of our papers - he couldn't get the first copy away from his

Senator. The “compliments” pages of our website detail a heartwarming litany of praise for value obtained.

In 1997 we are the oldest, largest and best-known independent think tank in our field in the world.

The deal that we articulated at the beginning was only this: Each of us is secure in a career. Let’s gamble two years on a venture that - if it works - will be personally fulfilling and will aid thought and action in the information world. We are both surprised at what that seed grew up to be.

Our method is not easily explained - but here’s the essence of it. Our role is to work with the people with the power. We want to make sure they understand what’s happening and how to think about it from all the angles. To do this we need to understand the key players and see how each of their pieces fits into the overall jigsaw puzzle. Then we need to inject this knowledge directly into the decision-making process.

That means that we need to have the confidence of organizations whose very existence may depend on annihilating each other. In order to pull off that trick, we impose some unusual limits on what we try to do.

First we don’t make decisions. That means no drafting legislation; no recommending lines of business, acquisitions or product lines; no endorsing options and no predicting the future. The people with the power want to make decisions themselves - and should. Only they know the inner workings of their power base - the resources, the interests, the politics. Only they will have to live with the tactics and the consequences.

Second we take every known measure to be impartial. That means no proprietary work; no consulting (in the usual sense); no “expert-witness” testimony; no serving on boards of directors or otherwise assuming responsibility; no non-disclosure agreements and no appearing on anyone’s platform in front of anyone else. Above all it means that we are funded only by hands-off gifts from parties so diverse that their interests cancel each other out. There have been over 500 organizations that contributed money and resources to us. And by the way no unlisted funding sources.

Third we must be not just impartial, but also well-informed. Many of our affiliates say that being both at the same time makes us unique and is our greatest achievement. Our internal production line produces books. Each selects some hard contentious problem, and tries to lay bare the real issues (as opposed to the superficial issues, smokescreens and red herrings), the players, their stakes, the forces the trends, the numbers, the arenas in which the battles will be fought, the rules, and how the rules can be changed. Once we’ve done the best draft we can from the ivory tower, out it goes for review by all the players. If we’re going to know what’s really happening, only they can tell us. Then we put it all together in a document that lays out all the varying facts, perspectives and angles. We make a map of the territory; our readers maneuver their armies.

We’ve found that if you’re inside a stakeholder, you simply can’t see the world from opposing perspectives. The reviews that come back, for example from AT&T, Apple, The Federal Communications Commission, and Japan look like each must be talking about a different world - including the basic facts

and what the underlying contention is all about. Our job is to lay them all out for the reader, then stand back and analyze what it means when you can see all the angles.

But just as a reminder, for us, “analysis” is a word with theological limits: no solving the problem (unless there’s only one choice), no predicting the future (unless it’s undisputable), and no disclosure of inside information or confidences (ever, period). We’re in the description and thinking business, not the solutions business, futures business or secrets business.

Each study produces knowledge, but so what? Our natural audience - senior decision makers - are too busy to read. Furthermore, they’re probably not worrying this week about the subject of our latest book.

In return for their contribution to our Program (we call it “affiliation”) they get an open door and a red carpet invitation to bring their problem around and talk it over. In practice, this is how we help bring solid thinking to bear on real decisions. People can drive our inventory of knowledge with their own agenda.

And they do. Perhaps thirty times a month Tony and/or I sit down in a confidential meeting with someone in government or business who lays out what he or she is worrying about. We usually hear about their biggest uncertainties, what they think is happening that calls for a decision, what they are considering doing, why they are considering doing it, etc. etc. This stuff is usually very different from what they say to an audience. What they tell us is kept in perfect confidence. Whatever we tell them we can trace back to publicly-available information or sound thought or common sense.

If it goes well, we hear that we have been an idea bounce and a sanity check, that we have prevented them reinventing some wheel, that we opened their eyes to new perspectives, or that we caused a paradigm-shift in their thinking. They continue to review our drafts and renew their contribution at the end of the year. And thus our unique engine moves forward.

If it goes badly, we survive because of our statistical stability. We have the freedom to tell people what they don’t want to hear, and we don’t always benefit financially by that habit.

We create about twenty-five books a year. All are available to the public, and many are republished by commercial presses and academic journals. We also offer seminars and courses within the University (and pay them overhead).

This whole thing is murder at cocktail parties when someone asks me what I do. From that angle I look forward to retirement.

I take about one airplane flight for every two working days. It’s a slight improvement over EDUCOM, but it’s the other angle from which I look forward to retirement.

## **THE INFORMATION AGE**

### **ONE**

I will quibble later with the phrase, “the information age”. But for starters it identifies the ballpark.

There's clearly too much story to tell in a few pages. I'll try to provide a sample by following the telephone industry and some of its encounters with other players: especially newspapers, computers, and governments.

Telephone histories are no rarer than Internet histories, and I won't rehash them here ("come here Mr. Watson..." and all that). Instead let's look at it, starting in the 1970's, from our angles.

Remember for starters that the telephone business was (and is) big. It was roughly ten times the size of the entire newspaper business or broadcasting business. That made AT&T, with 85% of the market, roughly four times bigger than the newspaper and broadcasting businesses combined. It was the largest company that had ever existed. Its gross revenues were bigger than the GDP of all but thirteen countries. It was classified by investors and regulated by governments as a "utility". That meant a "widows, cripples and orphans" security, and a monopoly with controlled investments and earnings.

Our relationship with AT&T began with Robert Lilley, then President. After hearing our peculiar sales pitch, he replied: "As you know, we've had every important economist in the country on our payroll. That means that if they say something favorable to our company, nobody will believe them. What you're doing is unique and different. If you say something positive about us, they might believe you because we didn't pay for it. If you say something negative about us, we can deny it because we didn't pay for it. We'll sign up."

Let's think of telephony as a business whose 20<sup>th</sup> century basics were determined by two growth engines: universal service and business applications (business); and two formulae: RB/ROR and rate-setting (financial underpinnings).

Growth engine #1: universal domestic voice service, commonly called "plain old telephone service", or "POTS". Universal (as opposed to partial) service was articulated early in the century by AT&T Chairman and Patron Saint Theodore Vail, and was put into law in the communications act of 1934. Vail is to telephones as Rockefeller is to oil - a hero inside the business, a ruthless aggressor to many others. "Universal service" in 1910, when almost nobody had a phone, may have been a glorious vision, or merely a political ploy. But it was nothing Vail could have expected to see in his lifetime. The communications act was little more than a rephrasing of the radio act of 1927 (itself a rephrasing of earlier railroad legislation) and the Interstate Commerce Act. It passed without debate. If Congress had anything in mind, it was a vague idea to be acted on long after the next election. At the close of World War II, the telephone was 79 years old and penetration was about 45% of households. Evolving that into "universal" became one of the great industrial growth stories of the century.

Growth engine #2: Telephone service to business: In the beginning, POTS was POTS for business too. But by our era the business market was sprouting additional services, such as CENTREX (central exchange service), leased lines, computer communications lines (usually measured in kilobits/second), large bulk accounts, and special pricing (more in a minute). The evolution from POTS to more complex and powerful services has been a vast success story as well.

Income distribution over customers was very lopsided, as is characteristic of utilities, greatly exceeding the 80/20 rule. The prime customer sector was financial services, followed by airlines.

Business usage - by the way - provided a view into the way telephony was vertically integrated, and not just a geographical monopoly. I was explaining the basics to a very senior insurance executive, who was accompanied by the firm's chief technical officer. I pointed out that if they wanted to connect their computers to their own computers across the street (and even in some cases inside a single building),

New England Tel would have to do it - it was illegal to do it themselves. The executive turned to his expert in complete disbelief: "could this possibly be true?" "Yes, we don't like it, but it is."

In the early seventies the local telco owned not only the switches and lines, but also the wiring within your house and the telephone set. All you got for your fee was the service.

The companies could also be said to own the vocabulary and the philosophy. Wiring was "outside wiring" or "inside wiring", depending on location - there was no "our wiring" and "your wiring" question of ownership. Anything they did not own (virtually nothing in those days) was a "foreign attachment". Service was "end-to-end", including maintenance (which was free). The companies' employees were deeply imbued with a sense of "total obligation" and "responsibility to the customer", made even more profound by the utility nature of the service and the obvious fact that nobody else could provide it.

**Formula #1:** The rate-base/rate-of-return formula:  $RR = OE + d + T + r(V - D)$ , or Revenue Requirement = operating expenses + taxes + depreciation + the allowed rate of return times the total cost of the plant minus total depreciation. Keep your eye on the ball, namely the last term " $r(V - D)$ ". This absurdly simple formula dictated the profitability of an industry that brought in over \$100 billion in 1970's dollars. It has only two determinants: " $r$ " the allowed rate of return is the percentage that governments will let you keep. Percentage of what? " $V - D$ " is the book value of the plant. Or put another way: You can only earn a percentage of the value of your assets. Operating expenses can be fun, they can be powerful; but they can't be profitable. The incentives built into this scheme have played a key role in how the industry met the winds of change.

**Formula #2:** The costing and pricing formulas. Ever wonder how the price of your telephone service was set, and why it was different from your cousin's bill in the next state? Don't commit yourself to mastering this one, or the rest of your productive life is gonzo. Rube Goldberg on steroids and LSD couldn't have dreamt up anything so complicated.

The underlying mechanism looks something like this: Your price is supposed to reflect what it costs the utility to provide what you used, plus a reasonable profit (see formula #1). When you ring me up, let's say from New York to Boston, you use your phone and my phone, plus the short wires dedicated to each. So far pretty straightforward - perhaps. But you also use some switches and lines in between that are used by other people, some of whom are calling from Bangor to Dallas and some of whom are businesses. You use some of the Chairman's time to organize all this. The opportunities for complexity already present themselves.

For starters, I didn't pay for my phone and wires when I answered your call. That would be politically unpalatable and a business disincentive. So those costs have been allocated to you. (The same reality hasn't quite hit the cellular business, but it's getting closer.)

Furthermore, your house is farther from the street than your next-door neighbor's and therefore has a greater installation cost. Do you pay different rates? No, that too would be politically unpalatable. There's cost averaging.

How about that stuff whose use we share with strangers, like the switches and the Chairman?

How do you compensate for varying minutes of use (mou's) on the same gear? How do you distinguish between traffic sensitive (ts) and non-traffic-sensitive (nts) costs?

If I've set up the questions clearly enough, then two things should now be clear: pricing is all about cost allocation, and cost allocation has some big components that are not economic. Exactly!

## TWO

Cost allocation was done by a clubby collection of telco and government players who all got together in one place and set the underlying structure and rules. (The places they met - Atlanta, Denver, Ozarks - gave their names to the costing plans) They had, among other things, social goals: principally the promotion of universal service (growth engine #1). Costs were disproportionately laid onto long distance, business, and to a lesser extent urban services in order to reduce residential and rural prices.

Because telco bashing has been a sport rivaling baseball, please let me praise a piece of work for which I have never seen telcos given credit. Both telephone penetration and long-distance usage are price elastic; in the sense that lower prices produce greater usage (though not necessarily greater profits). It would have been very easy for something to get off balance, such as unmeetable demand for telephones, hopeless clogging of long distance plant, or investments that couldn't be recovered. During all those years of juggling costs, it never happened - a brilliant accomplishment. Part of the reason it didn't happen was that prices were often set at market rates (neither strictly cost-based nor socially oriented). Depending on your school of thought, this was called Ramsey pricing, Pareto optimal pricing, value-of-service pricing, inverse-elasticity pricing, or hit-'em-for-what-they-can-pay.

Somewhere in our earliest musings, Tony or I must have used the word "subsidize". We were promptly invited to AT&T headquarters for a conversation. The two of us found ourselves in a room with about fifteen very senior executives. "There is something you gentlemen need to understand: there are no subsidies within the telephone network". They carefully explained that most of the cost pool was "joint and common costs" (such as the switches and the chairman), and therefore not strictly allocable to a particular service. Therefore each service (including your call to me) paid 100% of its strictly allocable (you could call them "incremental") costs. It also picked up a piece of the joint cost pool. Therefore nothing was failing to pay 100 percent of its strictly attributable costs, and hence no subsidy. In 1974, the word "subsidy" held a danger for AT&T, namely that the business customer would see itself as the subsidizer, and find another solution.

Whether there really was or was not subsidy now boils down to the meanings of words and senses of fairness about that vast joint cost pool. But they had articulated a fact that plays an eternally critical role in the telco wars. The assignment of joint costs is technically arbitrary (read politically flexible), and therefore there is no such thing as the "true cost" of a particular service.

Let's note some things about costing and pricing, and then move on:

First the machinery that set pricing was done from 1945 by a non-adversarial negotiation. It included all the stakeholders who cared to participate; and they were capable of agreement. This machinery broke down in the seventies and hasn't worked since. Stakeholders became too numerous and their stakes too diverse. This transformation may hold a lesson for countries experimenting with "industry self-regulation", as has been tried in the UK and Peru, and is now being tried in Australia and New Zealand. New Zealand is a unique example, having taken an extreme position of "government hands off". Telephone policy is now the product of the courts.

Second the whole vast scheme, under the banner of “cost-based pricing”, was actually the reverse: price-based costing. In case you were looking at your prices and wondering how costs dropped in half after 6 pm or the drugstore’s costs were twice your costs, your suspicions were justified.

Third, subsidy or no, the industry finished the sixties with prices for business, long-distance and urban services that might be beatable by a new-entrant competitor. Big customers - especially geographically dispersed companies who used a lot of long-distance service - could even provide service to themselves cheaper than buying it from telcos.

Fourth, the notion that costs could be precisely allocated, and therefore that pricing could be strictly cost based was deeply inculcated into telcos and regulators. This false assumption has confounded both company strategy and public policy ever since. Even the specific costing produced by the second Ozark plan distorted decision making for years.

We were the first people ever to diagram the whole costing, pricing and money-flow system. It was quite a set of charts. As I said, even Rube Goldberg.... Only a handful of people in the world had a grasp of how it worked, and probably none of them understood the pieces beyond their own responsibility. AT&T lost most of these specialists to the Bells upon divestiture on 1/1/84, and the Bells laid most of them off during the downsizing binge that followed. We found ourselves in the unexpected position of explaining key aspects of their internal operation to telcos, and later of being their only surviving institutional memory.

### **THREE**

When we first started working with GTE in the early seventies, Leslie Warner the Chairman called the business a “simple, comfortable industry”. Soon thereafter, he changed his tune to “It’s getting very messy, and I’m going to retire.” Sure enough, the next time we called, we were introduced to Theodore Brophy, the new Chairman.

The mess, of course, was competition. Competition is generally considered to have started with Carterfone or Hush-a-phone in the late sixties, entered the long distance business with Southern Pacific Communications (later SP, and yet later SPRINT) and DATRAN, and then galloped through the long-distance and “foreign attachments” businesses. In my view, histories of this sort dwell too much on formalities. There is more depth and breadth to the real story.

In fact they miss several real stories, each embedded within a larger one - a kind of reverse “layers-of-the-onion” metaphor.

The competition just named all advertised and offered something to a customer, and got formal blessing from the FCC - providing convenient dates that can be cited as “the beginning of competition in X.” These were, however, embedded in a larger collection of events. Each of the developments I worked on at BBN, MGH and EDUCOM are examples. Long before there was any fuss about offerings and permissions, organizations were doing things for themselves that they might earlier have simply purchased from a telco. In addition, some information services began to bundle in communications, trying to make their remoteness invisible or the access price fixed. General Electric Information Services (later GEISCO) offered an information processing utility, but also offered remote access as part of the plan. TYMSHARE offered access via TYMNET, a data networking technology developed independently of the ARPANET. (The Chairman of TYMSHARE complained bitterly to Congress that he was the victim of government-subsidized competition).

There was also a “who owns the technology” layer. Virtually all telephone technology had been developed at Bell Telephone Laboratories and Western Electric. By and large, that same technology was used by the 1600 independent telephone companies. It was used worldwide, and where it wasn’t, there were standardized interfaces to it. AT&T was very slow to recognize that anyone else was even capable of providing communications functionality, much less of doing it well or at a reasonable price. Competing technology sneaked up on it out of the computer industry, providing the first opportunity to misuse the term “convergence”. It remains a charming irony that the transistor was invented at Bell Labs, but its successful commercialization elsewhere eventually undid the parent company’s monopoly.

“Convergence” correctly recognized that the computer and telephone industries were now operating off a common technology base. It incorrectly concluded that these businesses were now competing to offer the same things to the same customers. Partial functional overlap, yes. Identity, no.

The escape of the technology (this is telco language, of course) was still only part of the history - in fact only part of the technology history. There are two other parts:

One is the obvious truth that the technology keeps getting dramatically cheaper and better. Moore’s law (from Gordon Moore of Intel) is the most often cited measure. It says that the number of transistors on a chip doubles every eighteen months. But Moore’s law refers to only computer chips. All the information technologies are improving like crazy. A common quip had it that if automobiles improved the same way, a Rolls Royce would cost fifty cents and get 15,000 miles to the gallon. Our own formulation is “SFCB”, or “Smaller, Faster, Cheaper, Better”. It applies to almost everything and every measure.

The less obvious truth is that the technology made a gradual change from being a scarce resource to being an abundant one. The two behave in fundamentally different ways. Scarce resources behave like the computers of my college days. The machine ran 24 hours a day, access was scheduled and a priesthood stood between me and it. Now there are computers in three of my thermostats and my microwave oven. They are used seconds a day, and when I want them, not when they will deign to serve me. When telephone technology was scarce, a monopoly utility was the only way to get it. Now hundreds of thousands of organizations provide service to themselves or others. A cross-country call in 1900 cost an average monthly wage and took a week to schedule. Now many families have a phone for the parents, another for the computer, and two for the kids. When I was young, the radio was the size of the desk and stood in the living room, where we haggled over its use. Now I can’t tell you how many radios are sitting in drawers somewhere. If automobiles had progressed similarly, we would all keep a few Rolls Royces around, just in case we need to go out for coffee. [REDACTED]

**. . . To be continued in the next two issues of the Monitor**



## History

### Operation Outward

#### Britain's World War II offensive balloons

Raoul E. Drapeau

Did you know about “the thousands of barrage balloons that Britain employed throughout the war to help protect cities, ports and other important targets from low-flying Luftwaffe dive bombers and fighters? These large gas balloons measured about 64ft (19.5m) long by 34ft (10.4m) in diameter and were tethered to the ground by steel cables attached to winches and rose to heights of up to 5,000ft (1,524m).”

The above lines have been taken from an article that has appeared in the latest issue of the IEEE P&E magazine (September/October, 2011, Vol. 9, No. 5) and has been linked to the Monitor with the kind permission of Mel Olken, the editor-in-chief of the Power and Energy magazine. To whet your appetite for history of technology some of the photographs are reproduced here. You can get the complete article by clicking here>> <http://sites.ieee.org/ny-monitor/files/2011/09/OPERATION-OUTWARD.pdf>

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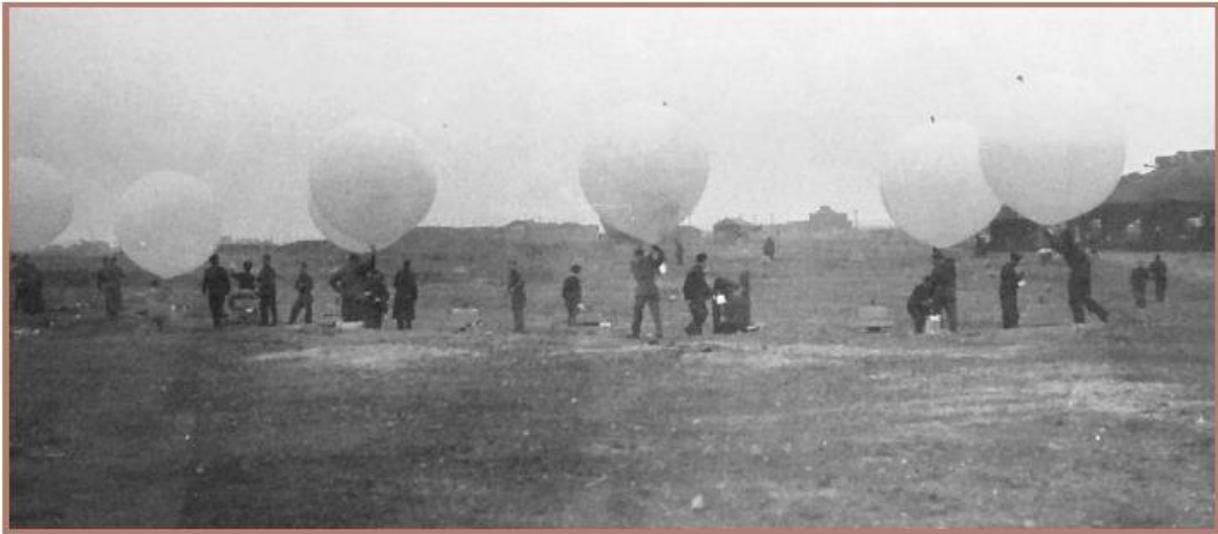
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**figure 1.** Barrage balloons over Buckingham Palace, London, during World War II (from *Air Publication 3003—A Brief History of the Royal Air Force*, 2004).



**figure 3.** Actual Operation Outward balloon launch from the Felixstowe, Suffolk, site (from The National Archives of the United Kingdom, folder #ADM 199-848).



**figure 4.** Royal Navy WREN Cecilia Banister, daughter of Captain C.G. Banister, director of Boom Defence for the Admiralty, lighting the fuse on a payload during a balloon launch operation (from E.G. Finley, *RCN Beach Commando W*, 1944, p. 71).



**figure 5.** Bent rotor from the Böhlen power station near Leipzig that was destroyed by an Operation Outward balloon on 12 July 1942 (from The National Archives of the United Kingdom, folder #ADM 199-848).



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## Review

### Audio-Technica QuietPoint Noise Canceling Headphones

Amitava Dutta-Roy



Every year I take two or three long-distance flights that last between 7 and 11 hours. The whine of the airplane engines is too much to bear for such prolonged periods. I was envious of my friends who could freely spend their disposable money to buy noise cancelling headphones. If I am not mistaken Bose Corporation was the first company to develop the technology and launch a tangible product in the market. But the catch was (and still is) that like any other Bose product the headphones were outrageously expensive. I would not spend so much money for a breather for nine hours.

Noise cancelling operation in headphones may be performed in two ways. Passive noise cancellation is achieved through putting covers on the phones and “sealing” any gap between the cover and the ear by pads of foam. The other is active noise cancelling (ANC) that is used by passengers in airplanes and requires electronics.

The principle behind the noise cancelling headphones is simple. Two tiny microphones placed behind the headphones pick up the ambient noise. The internal circuitry of the headphones then analyzes the noise and produces a replica of the salient signal but 180 degree out of phase from the original signal. If the audio power level of the out-of-phase component is adjusted to the level of the original noise arriving at the headphones then two components would cancel each other and there would be no noise impinging on the ear of the user. To lay persons it would seem that the process is most difficult. However, modern digital signal processors (DSP) on silicon do the job very fast, any time lag between the two signals being imperceptible to the human ear. The result is noise-free audio from the sockets placed on the armrests in airplane seats or MP3 players. The performance of the electronic circuitry is very effective if the dominant noise does not vary, for instance, inside airplanes where the whine of the engines is the only disturbing noise.

Some earphones have both ANC and passive foam padded covers that give a second layer of protection from noise. But they are slightly awkward to fold and carry. Others come in the form of ear buds. They are tiny and easy to carry in a pocket. Some people prefer one over the other. You should purchase one that you feel comfortable with. After all, you will presumably be using them for long flights!

Noise cancelling headphones are no longer novelties. They are part of the accessories experienced airline passengers carry. The Consumer Report has published information on them. Visit <http://www.consumerreports.org/cro/electronics-computers/audio-video/headphones/headphone-buying-advice/index.htm> to see the report.

My first purchase of ANC headphones was a pair made by Creative. It was much less expensive (prices at about \$60 online) than Bose and I found that they did a fine job. I enjoyed listening to the piped-in music cruising at 35,000 ft over the Atlantic (Airbus 340) or the Amazon forest (Boeing 747). But folding the headphones was another matter. Anyhow, I used them for three years or so. Then, on my last flight the delicate plastic hinge of the frame broke while I was about to put them on. Though the phones continue to work normally there is no way I can put them on my head. They're kaputt . . . .

I was thinking of acquiring a new pair of ANC headphones. In my search for an affordable unit that would perform reasonably well I looked at various Web sites. The choice is enormous as are the prices. Consumer's Report mentions 21 different brands: Altec Lansing, Apple, Audio-Technica, Audiovox, Bose, Coby, Creative, Denon, Etymotic, Grado, Insignia, JBL, JVC, Koss, Monster, Panasonic, Philips, Sennheiser, Shure, Skullcandy and Sony. The fact that the brands have appeared in the Consumer's Report may indicate that they are worth considering. Some have on-ear covers and others have in-ear buds. I never liked the circular ear buds, the inexpensive ones that seem to be included with practically every audio product. They easily fall off the ears.

At least two of the vendors mentioned in the above list, Audio-Technica and Monster exhibited their products at the recent CEA Line show in New York. The former showed off its compact ATH-ANC23 QuietPoint. Though they have in-ear buds the price is affordable, MSRP of \$99. But you can get them from online stores for \$79 or less. I decided to try them.

First and foremost I had to have a feeling for the ear buds. I found that they can be gently inserted into the ear canals. Their design is such that they enter the ear canal at an angle. The buds are covered with replaceable rubber tips. The tips are available in three sizes: small, medium and large (three extra sets are included in the package). I do not feel any discomfort while using the buds. My ears can respond to a frequency range that is between approximately 20 – 16,000 Hz and so I cannot verify the company's claim that the phones can reach frequencies up to 20kHz. But here I am not looking for a top-end surround sound ambient up in the sky. Active noise reduction of QuietPoint is claimed to be 20dB and sensitivity of 105dB. I am unable to judge these claims as well, since I do not pack measuring instruments in my bag when I fly. If I feel comfortable with the phones, that is good enough for me (I guess it is also true for majority of passengers). The sensitivity is adequate for drowning the drone of aircraft engines. It is possible that the QuietPoint would not work under ear-splitting sound of a disco. But why would I want to use a noise-cancelling device in a disco at all?



The QuietPoint control "box" measures approximately 2 1/4in x 1 1/16in x 5/16in and weighs less than one ounce. There is a sliding on/off switch on its side. Under normal noise-free listening ambiance the user can turn off the device off and still listen to music. That would prevent the drain of the battery. A 3.5mm stereo mini-plug can connect to a MP3 player. An airline two-pin adapter is also provided with the device. Note that the input impedance of the device is 32ohms. The length of the attached cable is 55 inches, long enough for even for a tall person. The control box can be clipped to a shirt or a blouse. Warning: do not use the clip if you happen to use the device during a flight. For, if you want to leave your seat and forget to "unclip" the device you

will almost certainly rip the cable off. In the on mode, an AAA battery (included) may last up to 60 hours, the vendor's claim that I have not verified. The phones, extra ear tips and the airline adapter come in a velvety pouch.

I took the QuietPoint on a recent flight (Boeing 777). It behaved as expected and to my satisfaction. They are good value of money within the mid-price range. If you happen to lose them you are down by \$80 and not \$300. However, like any other review in the Monitor this is not an endorsement but a statement of fact. If you want to purchase noise-cancelling headphones I suggest you read other reviews in the Consumer's Report and, if possible, try them out before coming to a decision. [REDACTED]

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## Tidbits

### Amitava Dutta-Roy



Suppose you have just posted online a new blog, an advertisement or a magazine, say the NY Monitor. Do you have any idea for how long people will access the site even if it is fairly popular? Nick Bolton of New York Times has posted an article in the newspaper's blog about the subject. According to Bolton's source, Bitly, a company that specializes in the matters of links, the average lifetime (*not half lifetime that we engineers are used to*) is less than three hours. If the item is news-related the lifetime is even shorter, about 5 minutes. Apparently, immediately after the posting of the contents there is a short peak period during which a large number of people click to access the site. Soon after this peak the access rate drastically wanes. I have noticed that the hit rate at the Monitor follows the same *general* pattern though I must confess that my observations are not scientific.

One explanation comes to my mind is that often the article or the news item you wish to access has a complex URL. People tend forget complex addresses. They are not as simple as <google.com>, <amazon.com>, <colombia.edu> or even <ieee.org>. Is there is a way to simplify and shorten the long and complex URLs? It seems that there is a way. I have not tried to dig deep into it. But I will do so soon and hope to report back to you. In the meantime, if you wish you read Bolton's article go to <http://bits.blogs.nytimes.com/2011/09/07/the-lifespan-of-a-link/>, itself a complex URL, to say the least.

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