Dear Sirs and Madams,

I send you this brief report of my DLT to Puebla, Mexico, San Salvador, Panama, and Colombia held in October 2007. I thank you and all involved Chapters, who made this tour possible.

As I wrote in all my past reports, I do believe that DLTs are an excellent ComSoc initiative, allowing students and professionals to attend lectures given in their country by international distinguished experts. On the other side, the lecturer himself has the pleasant opportunity to visit other universities and companies and exchange ideas with researchers sharing common interests.

What's more, DLTs may be very effective to foster IEEE ComSoc membership, by promoting the image of leadership of ComSoc in disseminating R&D results in communications areas.

It is a honour and a pleasure to serve as DL. Honestly speaking, this is my ComSoc appointment which I have ever been most proud of.

Best regards.
Stefano Bregni

REPORT OF BREGNI'S DLT
IN PUEBLA, MEXICO, EL SALVADOR, PANAMA AND COLOMBIA
OCTOBER 2007

OVERALL IMPRESSION

This has been my fourth DLT in Latin America. It has been the longest I ever had: 5 locations were hit and 7 talks were given. Based on previous experiences of DLTs in Latin America, I was not surprised that also this one resulted, as I expected, yet another outstanding and memorable experience!

The warm welcome of all my hosts, the effective organization by all chapters and the beauty of the places I visited made also this tour unforgettable. I wish to thank everybody involved in its organization, beginning with Araceli G. Gomez (LA Region Director) and Jose L. V. Gonzalez (LA DLT Coordinator and Puebla IEEE Section Chair) who started everything, together with all those who welcomed me in the towns I visited. I hope I will have the opportunity to meet them and to visit all these places again and as soon as possible.

That fact that I was welcomed in all cities as an old-time friend, and not as yet another business guest, really makes the difference between a DLT like this one and a regular work travel. Also for this, I am very grateful to everybody: for their friendship, for the time they spent with me, sometimes even bringing other friends or relatives, for what they showed me of their cities even in the limited spare time.

In all locations, I had the impression that local chapters organized and promoted the lectures very well. All events were well attended by numerous groups, in some cases composed mainly of university students and faculty members, while in some others mainly of professionals and
technical personnel of important telcos. The IEEE ComSoc activities were presented and the advantages of being ComSoc members were pointed out too.

In the following sections, I summarize the main facts of this tour.

**DLT SUMMARY**

My 2007 Distinguished Lecturer Tour hit Puebla (Mexico), Mexico City, San Salvador, Panama and Cartagena (Colombia), from 30 September to 13 October 2007. This DLT was organized by the joint effort of the LA Region board (Araceli Garcia Gomez and Jose Luis Vazquez) and of the IEEE ComSoc Chapters and IEEE Sections of Puebla, Mexico, El Salvador, Panama and Colombia.

Lectures entitled "Synchronization of Digital Telecommunications Networks" and "Introduction to PDH and SDH Transmission Systems" were given at the following locations and dates:

1) Puebla, Mexico, Univ. De Las Americas (UDLA), 1 October 2007;
2) Puebla, Mexico, Univ. De Las Americas (UDLA), 2 October 2007;
3) Mexico City, Instituto Politécnico Nacional - UPIITA, 3 October 2007;
4) San Salvador, Hotel Terraza, 5 October 2007;
5) Panama, Riande Continental Hotel, 8 October 2007;
6) Panama, Riande Continental Hotel, 9 October 2007;
7) Cartagena, Colombia, Univ. Tecnologica de Bolivar, 11 October 2007.

Although my main and best known DLP lecture is the one on synchronization of digital networks, a version of which is also offered online on the IEEE Communications Society web site in the program Tutorials Now!, this year I was requested by the Puebla and Panama Chapters to add also a primer on PDH and SDH transmission systems. I have been teaching this subject in university and industry since more than 10 years, so I was happy to add this short course too.

The attending groups in some cases were composed mainly of university students and faculty members, while in some others mainly of professionals and technical personnel of important telcos. According to the varied audience, the lecture was adjusted, to meet different expectations and interests.

**DLT OUTLINE**

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
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<tbody>
<tr>
<td>Sun 30 Sep</td>
<td>flight Milano-Amsterdam-Mexico, bus to Puebla</td>
</tr>
<tr>
<td>Mon 1 Oct</td>
<td>Puebla: lecture at Univ. De Las Americas (half day), sightseeing</td>
</tr>
<tr>
<td>Tue 2 Oct</td>
<td>Puebla: lecture at Univ. De Las Americas (half day), bus to Mexico City</td>
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<tr>
<td>Wed 3 Oct</td>
<td>Mexico: lecture at Instituto Politécnico Nacional - UPIITA (half day), sightseeing</td>
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<tr>
<td>Thu 4 Oct</td>
<td>flight Mexico-SanSalvador</td>
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<tr>
<td>Fri 5 Oct</td>
<td>San Salvador: lecture at Hotel Terraza (full day)</td>
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<tr>
<td>Sat 6 Oct</td>
<td>San Salvador: sightseeing</td>
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<tr>
<td>Sun 7 Oct</td>
<td>flight SanSalvador-Panama</td>
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<tr>
<td>Mon 8 Oct</td>
<td>Panama: sightseeing, lecture at Riande Continental Hotel (half day)</td>
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<tr>
<td>Tue 9 Oct</td>
<td>Panama: sightseeing, lecture at Riande Continental Hotel (half day)</td>
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<tr>
<td>Wed 10 Oct</td>
<td>flight Panama-Cartagena</td>
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<tr>
<td>Thu 11 Oct</td>
<td>Cartagena: sightseeing, lecture at Univ. Tecnologica de Bolivar (half day)</td>
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<tr>
<td>Fri 12 Oct</td>
<td>Cartagena: meetings and sightseeing</td>
</tr>
<tr>
<td>Wed 17 Oct</td>
<td>flight Cartagena-Bogota-Paris-Milano</td>
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PUEBLA

In Puebla, I gave two different half-day lectures in the ample conference room of the library of the Universidad De Las Americas (UDLA):
"Introduction to PDH and SDH Transmission Systems", Mon 1 Oct, morning;
"Synchronization of Digital Telecommunications Networks", Tue 2 Oct, morning.

The audience was very numerous, consisting of students and some professors. All were very interested and appreciated the talk very much. Several questions were also asked. The talk was organized very well in all details.

My stay and lectures in Puebla were effectively organized by Jose Luis Vazquez Gonzalez, DLT Coordinator for Latin America and Chair of the Puebla IEEE Section, and by Luis G. Guerrero Ojeda, Chair of the Puebla IEEE ComSoc Chapter, both Professors at UDLA. I wish to thank both for the long time and effort they spent in organizing all details of my lectures, stay and transfers between Puebla and Mexico.

As accommodation, I was hosted at the hotel Holiday Inn La Noria, a very good business accommodation not far from the city centre and from UDLA.

Luis Ojeda accompanied me before and after the lectures. In the afternoon after the first lecture, he took me to visit downtown Puebla, which is a very nice town with many old buildings in traditional style. The afternoon of the second day, after the lecture and before taking me to catch the bus to Mexico City, he took me to visit one of the major tourist attractions of the area: the Pyramid of Cholula, not far from Puebla.

The Pyramid of Cholula is the largest monument ever constructed anywhere in the world, even one third larger in volume than that of the Great Pyramid of Giza in Egypt (which is taller, however). This complex is actually a set of pyramids constructed one above the other, built from 2nd century BC till the 16th century AD. Today, the pyramid appears to be a natural hill surmounted by a church: the Iglesia de Nuestra Señora de los Remedios, built by the Spanish (1594) on the site of a pre-Hispanic temple. 8 km of tunnels, excavated by archeologists throught the hill, allow to see some of the inner walls. For more details and photos: http://en.wikipedia.org/wiki/Great_Pyramid_of_Cholula

After the visit to the pyramid, we went to drink something in a nearby traditional restaurant. There, I had the pleasure to drink a refreshing cup of pulque, which is a traditional Aztech alcoholic (<10°) drink, still common in some areas of Mexico. Pulque is made from the fresh juice of Maguey, a sort of agave, fermented a few days and readily served. Since it cannot be conserved, it is mostly unknown outside the areas of production. It looks like a pale milkish juice, with light sour taste.

MEXICO CITY

I gave the half-day lecture "Synchronization of Digital Telecommunications Networks" at UPIITA, the Engineering school of the Instituto Politécnico Nacional in Mexico City (the National Polytechnic University of Mexico), the morning of Wed 3 Oct.

Also here, the audience was numerous, consisting of students and some professors. All were very interested and appreciated the talk very much. The talk was organized very well in all details.
My stay and lecture in Mexico were effectively organized by Fernando Tavera, Chair of the IEEE ComSoc Chapter of Mexico. I wish to thank him very much, for having invited me in Mexico City, for the second time after my first DLT in 2003, and for all the effort he spent in organizing the event so well.

Fernando is an executive of TELMEX. I consider especially noteworthy the fact that a high-level manager of a big private company invests so much time in IEEE activities, and in particular for organizing lectures by international experts at no charge for the students of the Mexican universities.

As accommodation, I was hosted at the hotel Maria Cristina, not far from the Avenida Reforma, Zocalo and the Zona Rosa.

After the lecture, Fernando took me to have an excellent lunch at a typical Yucatan restaurant. Fernando is a good gourmet, so I appreciated very much his explanations about food and the outstanding Tequila Centenario Añejo, which he recommended me and we enjoyed together. I liked it so much, that I did not miss the opportunity to buy a bottle of it before leaving Mexico.

Unfortunately, this time I had very little free time for visiting tourist places of Mexico City. I could only walk in the historical centre few hours at evening and night, to see some of its main monuments and nice buildings.

SAN SALVADOR

I gave the full-day lecture "Synchronization of Digital Telecommunications Networks" at the Hotel Terraza on Friday 5 Oct.

Here, the audience consisted mainly of professionals working in telecommunications companies of El Salvador, as well as university students. Also two engineers from a telecom operator of Honduras came to attend the course. The lecture was appreciated indeed, especially for its practical side.

Also here, the talk was organized very well. Being planned as a full-day event, there was plenty of time for answering questions and for detailing all aspects.

My stay and lecture in San Salvador were effectively organized by Arne Guerra, past Chair of the El Salvador IEEE ComSoc Chapter, Armando Torres Mármol, Chair of the El Salvador IEEE ComSoc Chapter Chair, and Gustavo Napoleon Chavez, Chair of the El Salvador IEEE Section. I wish to thank them very much for having invited me in San Salvador, for the second time, and for all the effort they spent in organizing the event so well.

As accommodation, I was hosted at the Hotel Vista Amarella, a neat small hotel close to the Hotel Terraza and to Paseo Escalon, one of the main avenues of the city.

This was my second time in El Salvador, after my first DLT in 2003, a country which I like very much for its natural beauty and for the sweetness of its people. I believe that El Salvador is not known enough, neither it is visited by international tourists as much as it would deserve. I hope that I will have the opportunity, in the future, to spend more than a few days in this country, thus being able to explore more and to enjoy its atmosphere.
Right after my arrival, on afternoon of 4 Oct, I enjoyed a long walk from my hotel to downtown. I wandered around the Cathedral, the central market with its dense crowd and the Zona Medica. I was surprised to notice only a couple of tourists besides me.

The first night, Armando Torres and Gustavo Napoleon Chavez took me out to taste pupusas, the most common Salvadorean food, which is a sort of hot little cake, cooked on grill and filled with meat or cheese. The second night, Armando took me to a fancy Peruan restaurant in the new modern area for night amusements, the Grand Via, which is taking the role of the old Zona Rosa for the well-off people of San Salvador.

On Saturday, Gustavo, with his wife and nephew, accompanied me by car for a wonderful full day of sightseeing around El Salvador. We went first to the Coatepeque Lake, a big volcanic lake surrounded by touristic resorts. Then, we headed to El Tazumal, one of the main Maya archeological site of El Salvador, featuring a pyramid and a museum. Finally, we went to Suchitoto, a small and cozy colonial village in traditional style, overlooking a big lake, which is under strong tourist development after it was almost abandoned during the civil war of twenty years ago.

My sojourn in El Salvador was really pleasant, for the places visited and for the warm company of Armando, Gustavo and also their families, who made their best to make me feel like at home.

**PANAMA**

I gave the lecture "Synchronization of Digital Telecommunications Networks" split in two half-day parts at the Riande Continental Hotel on Mon 8 Oct and Tue 9 Oct.

Here, the audience was mixed and consisted of professionals working in telecommunications companies and university students. The lecture was appreciated indeed, judging from the numerous and appropriate questions received.

My stay and lectures in Panama were effectively organized by Ivan Armuelles (Univ. of Panama), Chair of the Panama IEEE ComSoc Chapter, supported by Haydi Galvez, elected Chair of the Panama IEEE Section, and Gustavo Diaz, Chair of the Panama IEEE Section. I wish to thank them very much for having invited me in Panama for the second time, after my DLT in 2006, and for all the effort they spent in organizing the event meticulously.

The talk was organized very well. Being planned as a full-day event, there was plenty of time for answering questions and for detailing all aspects. Before my lecture, Ivan gave a 10-minutes presentation about the IEEE Communications Society, its activities and mission. I think this is an excellent idea, since the first goal of DLTs is to promote IEEE ComSoc and to boost membership.

As accommodation, I was hosted at the Riande Continental Hotel, a good 4-stars hotel in the business area of Cd. Panama.

I was very happy to visit Panama and to meet Ivan and Gustavo, again after my DLT of 2006, and Haydi. They invited me for a dinner in the restaurant that overlooks the Channel, where we enjoyed good food while observing the passage of a big ship carrying containers.

Unfortunately, this year my plans of visiting more of Panama conflicted with some urgent work to do and with the paper review management process of ICC2008, where I serve as General
Conference co-chair. The deadline for assigning papers to TPC members was already expired, so I had to spend several hours in the hotel room to work on this and other matters.

However, I did not miss the opportunity to visit a bit of Cd. Panama on my own, walking around and exploring areas also outside the canonical touristic spots. The historical centre, with its colonial architecture, is a beautiful and picturesque area that no visitor should miss. I hope to be able to see more the next time, possibly not as a rushy "hit&go" tourist.

CARTAGENA

I gave the half-day lecture "Synchronization of Digital Telecommunications Networks" at Universidad Tecnologica de Bolivar, in Manga, Cartagena, the afternoon of Thu 11 Oct.

Also here, I was favourably impressed by noticing that the audience was rather numerous and interested. My lecture was attended by graduate and undergraduate students, faculty professors and professionals who work in the areas. The talk was organized very well in all details. The same day and the day after too, I was also invited to visit the university and to meet some professors.

My stay and lecture in Cartagena were well organized mainly by Karen Katherine Barrios Bustillo, past-Chair (2006) of the IEEE Student Branch of Cartagena, Univ. Tecn. de Bolivar (Rama Estudiantil IEEE - Unitecn. de Cartagena), with the effective support of Jose David Cely, Chair of the Colombia IEEE Section, past Chair of the Colombia IEEE ComSoc Chapter (2006). Also other members of the IEEE Student Branch of Unitecn. Cartagena gave their valuable contribution: Alberto Carlos Peña Palacios, current chair (2007), Lía Susana Silva López, treasurer, and Prof. Gonzalo Lopez Vergara. I wish to thank them very much, for having invited me in Cartagena, for the effort spent in organization and for their friendship.

As accommodation, I was hosted at the hotel Tres Banderas, in San Diego, a neat small hotel right in the middle of the Centro Historico of Cartagena, carefully selected by Karen.

El Centro is on the UNESCO's World Heritage list and exhibits an impressive fortification system, comprising walls and a big castle. All houses are in Spanish colonial style, painted with different bright colors and very well maintained. I am a photo-hobbist and I was so sorry to have left my heavy weapons (Nikon reflex + 5 lenses) in Italy. Thus, I did my best to capture the colors, the atmosphere, the faces of people with a small digital camera, but I missed many opportunities. In addition to its beauty, El Centro features many good and excellent restaurants, where to taste authentic Costeño, Criollo or Caribe food, and a vibrant nightlife, especially on weekends.

Karen, Alberto and Gonzalo took me out several times, to visit the most beautiful places in town and some excellent restaurants. I sincerely owe them a big thanks also for this. I look forward to meet them again and to visit Cartagena one more time soon. Colombia is a wonderful country, for its nature and for its people, and Cartagena is one of its gems.

ANNEX: LECTURE ABSTRACTS

Synchronization of Digital Telecommunications Networks

Network synchronization has gained increasing importance in telecommunications throughout the last thirty years: digital switching, SDH/SONET, ATM, CDMA, GSM and UMTS are striking examples where network synchronization has been proven to affect quality of service.
In this tutorial lecture, synchronization processes at different levels in telecommunications are first reviewed and fundamental definitions about timing of digital signals, jitter and wander are introduced. Major topics of this tutorial are: timing aspects in SDH/SONET networks; architectures and requirements for timing transfer in PDH, SDH/SONET, ATM and fixed/mobile telephone networks; strategies, architectures and clocks for synchronization networks.

**Introduction to PDH and SDH Transmission Systems**

This tutorial lecture overviews essential principles of Plesiochronous Digital Hierarchy (PDH) and Synchronous Digital Hierarchy (SDH) multiplexing systems. Major topics of this tutorial are: basics of digital multiplexing, PDH multiplexing systems, advantages of SDH multiplexing systems, SDH frame structures, data transport over SDH, SDH equipment, SDH networks and traffic protection, SDH network management.

All topics are highlighted concisely, due to the limited tutorial length, still providing a comprehensive overview of main characterizing aspects of PDH and SDH.

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