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Digital Terrestrial Television Deployment in Europe

By Josemaria Malgosa-Sanahuja and Joan Garcia-Haro, Spain

Digital terrestrial television (DTT) is digital TV through an aerial channel. With DTT, neither satellite dish nor cable connection is needed, because it takes advantage of the traditional antenna infrastructure already installed in every home. Like satellite or cable, DTT customers have to incorporate equipment called a set-top box, which is responsible for translating the received digital signal to analog format. Usually, the set-top box is external rental equipment, but some TV manufactures offer a built-in set-top box integrated into the TV set.

DTT will gradually replace the existing analog broadcast systems (although the dates for analog switchoff are not the same in all countries, all of them fall within the 2008–2015 period). As with conventional TV channels, DTT uses the UHF channels to carry the modulated signal, but now in each channel up to six TV programs can be transmitted simultaneously (thanks to MPEG compression and OFDM modulation technology). This is why, in this context, each UHF channel is known as a multiplex. The number of multiplexes used by DTT depends on the particular country; for example, the United Kingdom has six different multiplexes (i.e., about 30 digital TV channels) but Spain, with much more unoccupied spectrum, has 11 multiplexes. The digital TV technology selected also differs. For example, in Europe two sound channels encoded with MPEG audio are used, but the United States employs 5+1 channels encoding the Dolby Digital system.

Essentially, there are four main differences between analog and digital TV transmission. First, with DTT, coverage similar to that obtained through analog TV technology can be achieved at much lower power levels. Second, with digital transmission we can introduce more services into the current crowded frequency bands. Third, the digital signal is more noise-robust than analog; and finally, DTT can be tuned more easily than analog in a mobile environment.

The DTT explosion in Europe started in November 1998, when the United Kingdom launched its digital multiplex on the market. Sweden and Spain quickly started DTT operation in April 1999 and May 2000, respectively. Ireland, Finland, and Norway are carrying out tests and are interested in introducing digital services over the years 2000–2001. France is building up regional service trials, and Italy may move some existing analog broadcasters to satellite to release spectrum for digital operators. Germany is focusing on mobile DTT reception because it is a highly cabled country, and therefore telecommunication companies can reach more viewers using portable television sets (without cable connection, i.e., living room restriction). Moreover, Germany is testing DTT reception even when mobiles run at very high speeds (250 km/h). In the near future, cars, buses and trains will be able to receive perfect digital pictures on the move.

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Collaboration Between GCN and E-News

By Algirdas Pakstas,
Associate Editor, Global Communications Newsletter

The *IEEE Communications Society Electronic Newsletter* (established in October 1998) is a free service and is sent out bimonthly to ComSoc members, others who subscribe to our many magazines and journals, and attendees at the more than 50 annual conferences, meetings, workshops, and symposia we sponsor. The goal of the newsletter is simple: to provide readers with current information about the profession, ComSoc activities, and notable events that may be of interest. These might include calls for papers, a calendar of upcoming special issues of our magazines and journals, original papers recently posted to our free online publication (*IEEE Communications Surveys*), prominent meetings and conferences, and plans for expanding our member services. The URL is http://www.comsoc.org/e-news.

Thus, E-News has a lot in common with the *Global Communications Newsletter*. As a new step in the development of GCN and E-News, on January 9, 2001 an agreement was reached between GCN and E-News about collaboration and exchange of relevant materials between both editorial teams. It is planned that any materials suitable to E-News will be forwarded from GCN to E-News, and the GCN team will receive similar materials from E-News. We are sure that it will be beneficial for both publications because GCN is a kind of hard-copy archive which is accessible to many ComSoc members who are not receiving E-news. In the same way, distribution of some GCN materials via E-News will help to deliver the appropriate news to "wired" members in the most timely manner.

Because of the different natures and scopes of the publications, each will maintain its own identity; mostly articles on Chapters and Technical Committees activities as well as Conference reports are expected to be exchanged.

Spanish Plan for Scientific Research, Development, and Technological Innovation (2000–2003): Challenges, Figures, and Judgments

By Fernando Cerdan and Joan Garcia-Haro, Spain

Progress of advanced societies is closely related to the capacity of governments to propose appropriate criteria and to dictate active and useful laws to guide basic applied science and technology. To be effective, this stimulus has to be coordinated among public and private sectors. The goals must be efficient investment and sharing of resources to improve the amount and quality of research as well as generate high tech applications and goods.

Nowadays most research, development, and technological innovation is driven by the information and telecommunication technologies, favoring solutions of the main challenges of our society (economy, competitiveness, jobs, quality of life, etc.) and influencing many aspects of it as well as other scientific fields (biology, medicine, etc.). In this context, changes are necessarily fast to find the answers that evolution and its associated human needs demand.

Even though research related to information technologies has a considerable position in Spain and in the last years a remarkable increment of resources was dedicated to new technologies, only a few Spanish companies are currently active in research, development, and innovation. This is quite surprising given the excellent economical expectations in the sector, with an increase of 15 percent experienced during 1999.

Definitely, most of the Spanish companies in the information technologies and telecommunications sectors exhibit a low research and innovation potential since they basically operate networks, offer services, and assemble or integrate systems; all this, with a strong dependence on foreign technologies. In addition, it gives rise to little capacity to export technology and related products. Insufficient R&D activities are quite evident. Companies spend a small part of their budget on R&D, and the personnel involved in R&D are very few as well. Consequently, research and innovation is out of the scope of most Spanish corporations, which further complicates their cooperation with public R&D centers.

Spain is one of the developed countries with the lowest budget dedicated to R&D. Investment has slowly increased from 0.37 percent of the gross national product during the '80s to the current 1 percent, and the 1.2 percent intended for the year 2003. Despite this effort, it is still far from the 2 percent European Union average or the 2.6 percent devoted by the United States. Besides that, participation of the private sector only covers 44.7 percent of the total investment in research compared to 60 percent on average for countries in our area. The ideal situation is where private companies invest more than 60 percent, leaving the rest to the public system. However, most Spanish companies are medium and small sized and cannot afford such economic effort. Some measures permitting those companies to collaborate and to benefit from the public system are thus needed.

In this framework, the Spanish Plan of Scientific Research, Development and Technologic Innovation for the period 2000–2003 was issued with the challenge of providing the scientific and technological Spanish community the means needed to carry out a meaningful task with international visibility. The new plan involves three key elements: science, technology, and incentives to the private sector. This plan includes notable tax savings to those companies that invest in R&D activities. Another important goal is to promote the integration of research platforms with common objectives, currently working on isolation in medium- and long-term joint research projects. Scientific results as well as technology transfer to companies to yield innovative commercial products are also pursued. In addition, this flow of knowledge should be conveyed to our companies, making specific advanced technological centers to support them. Therefore, an improvement of their technology level should be reached, gaining in competitiveness and global market adaptation. The opportunity to produce economic activity derived from this technological research is thus considered.

This model focuses on companies to encourage their cooperation with the public R&D centers, where universities play an important role. It is well known that universities are good places to create and develop novel and innovative ideas. In some countries there is a long tradition of collaboration between universities and the private sector, and agile and successful businesses are created around university research teams in the form of startup or spinoff companies. This is not usual in Spain, partially due to some of the problems explained above, but also caused by a poor economic incentive system for researchers. Public Spanish research projects try to join private corporations by stimulating them economically (low taxes, loans, subsidies); however, the benefit public

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Chapter Activities

Indonesia

Ismail Ahmad, ComSoc Chapter Chair, IEEE Indonesia Section, ismail_ad@yahoo.com, informs us that the ComSoc Chapter of the IEEE Indonesia Section conducted a tutorial. "WAP Security." The tutorial was held on December 13, 2000. The speakers were from NOKIA and the Indonesia GSM operator. For more information, please contact Ismail.

Jamaica

Dennis Hartley, Jamaica IEEE Chapter Chair, Dennis.Hartley@cwjm.cwplc.com, has informed us that the ComSoc Chapter of Jamaica held its Annual General Meeting on Wednesday, December 13, 2000. The new Eecutive Committee was elected:

Chair	Dennis Hartley
V/Chair	Winston Smith
Secretary	Winston Browning
Treasurer	Amlin Forrest

Expectations are that in 2001 the Chapter will be more active than previously. Activities are projected to be in seminars, tutorials, and special meeting presentations.

Monterrey, Mexico

José Antonio de la O Serna, Monterrey ComSoc Chapter Chair, jdelao@ccr.dsi.uanl.mx, has informed us that Monterrey Tech continues to lead Monterrey ComSoc Chapter activities. On November 14, 2000, Dr. Cesar Vargas, coordinator of the Master of Science Program in Telecommunications, invited Dr. Fred Homayoun, Vice-President of Global Wireless Internet Systems Engineering and Network Planning of Nortel Networks, to speak about the "Opportunities of 3G Wireless Networks." Around 50 students and authorities from the Monterrey Campus attended the conference. In his speech, Dr. Homayoun pointed out the importance of regarding mobile telecommunications as a business, and the impact of the economic and financial decisions on network design. This activity preludes a course on network management the chapter intends to organize next year.

Developments in Online Banking in Croatia from 1998 to 2000

By V. Bosilj Vuksic and I. Strugar, Croatia

Presently the number of Internet users in Croatia covers about 6 percent of the population (250,000), with a trend of growth. Different international surveys show that Internet users are an extremely interesting potential customer base for the banking industry for at least three reasons: education, age, and level of income. These three Internet demographic factors appear to have a synergic effect on the potential growth of online banking. This part of the population is interested not only in basic financial transactions and account balance information, but rather in higher-level financial and credit services.

This survey presents the extent of online banking services in Croatian banks. The Web sites of Croatian banks are analyzed and compared in order to identify the experiences and trends. The initial research done in 1998 was made on a sample of 53 banks (23 of which had Web sites). According to the analysis made in 1998, Croatian banks' Web sites were categorized as entry-level or "brochureware" sites because they offered only general information on the banks and their products, while noone offered online banking.

The next stage of this research was fulfilled in 2000. The main source of data on Croatian banks was the special report of Croatian National Bank made at the request of the authors for the purpose of this research. According to the report of March 2000, there were 52 active banks (two under the temporary direction of Croatian National Bank; one has initiated proceedings of bankruptcy). Web sites of Croatian banks have been located by three sources: (1) catalogs of Web sites in Croatia, (2) CROSS — Croatia Search Service, and (3) AltaVista Search. The data were collected in March 2000.

The Web sites of Croatian companies are analyzed according to two criteria: (1) main attributes of Web sites, and (2) main online banking services on Croatian banks' Web sites. The results of the analysis are compared to the results of the previous research done in 1998.

Among 52 banks in Croatia, 18 of them, or 34 percent, have Web sites. The analysis of Web sites showed that the banks mostly tend to describe themselves and their business activities (Table 1). Basic data about the banks are presented on all Web sites; 88 percent of Web sites have an index or directory that refers to the bank's internal organization, addresses of departments, and office phone numbers. Approximately 90 percent of Croatian banks present a very detailed company profile and a catalog of services (loans, rates of interest, rate of exchange, etc.) on their Web sites. About half the banks provide financial facts, news, press releases, and links to other sites. Only 5 percent of banks offered a search utility and online banking demo software package to their potential customers.

Online banking feature	Number of Web sites	Percentage of Web sites
Access to current account	5	100
Access to bank account	5	100
Access to savings accounts	1	20
Account balance	5	100
Transaction history	3	60
Transfer funds between accounts	3	60
Transfer funds to other bank accounts	3	60
Transfer money abroad	0	0
Check ordering	1	20
Standing orders	2	40

Table 2. *The Internet online banking features in Croatian banks.*

Customer communication	Number of Web sites	Percentage Web sites
Basic data about the bank	18	100
Index/directory	16	88
Links to other sites	8	44
Pre-sales support		
Catalog of services	17	94
Banks' profile	16	88
News, press releases	10	55
Financial facts	9	50
Search utility	1	5
Online banking demo package	1	5

Table 1. *Customer communications and presales support elements of banks' Web sites.*

The analysis showed that even nine Croatian banks (17 percent of all Croatian banks, or 50 percent of Croatian banks with Web sites) have moved their business activities from traditional distribution channels toward more flexible ways of doing business. One third (three) conduct phone service, one bank offered phone and/or GSM service, one bank had only Internet service, and one bank used a private online service (telebanking) and/or phone service, while three banks used Internet and/or phone service. According to the results of the analysis, five Croatian banks (9 percent of all Croatian banks, 27 percent of Croatian banks with Web sites) implement online banking services.

Web sites of five Croatian banks with Internet online banking were analyzed according to their features (Table 2). All features present on Croatian banks' Web sites could be considered basic online banking activities. It should be pointed out that basic features were not completely supported by Croatian banks. Only one bank provided transactions with current accounts, bank accounts, and savings accounts, while all of them provided current accounts and bank accounts balance. Two banks facilitated setting up a standing order, only one bank enabled check ordering, while no bank supported transfer of money abroad.

After-sales activities, such as customer service and interactive feedback (enabled by e-mail and/or customer service phone number), were included in online banking services, while an FAQ facility was not offered, although it could be very useful for both sides, banks and customers.

A comparison between 1998 and 2000 showed that the main progress was the increased number of banks with online banking services (from 0 to 5). According to the results of the analysis in 2000, Croatian banks have adopted basic online applications and servicing of accounts. However, weak

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ECUMN'00 Conference Summary

By Renato Israël, France

The first European Conference on Universal Multiservice Networks (co-sponsored by Comsoc) took place from the 2nd to 4th October 2000, in Colmar, France. It gathered approximately 100 participants originating from 25 different countries, with a breakdown Academia/Industry of 60/40.

	France	EU+AELE	East Europe	Asia	N. America	Others
Papers	12	22	4	9	5	1
Participants	19	32	11	13	13	9

Ninety papers had been submitted, of which 53 were selected by the Scientific Committee. In addition two Tutorials were presented: Communication Architecture for Wireless Networks, and Active Networks and their management

Details of the origin of the papers and of the participants are given in the accompanying table

The main subjects discussed during the Technical Sessions have been:

Traffic Management

Unicast and Multicast Routing

Convergence of Architectures and of Networks

Interconnection between IP Networks and ATM Networks, IP and IN

Mobile Networks and Services

Active Networks and Mobile Code Techniques

A panel discussion on Network Convergence took place between representatives of Network Operators (Deutsche Telekom and France Telecom) and representatives of equipment manufacturers (Alcatel, CS Telecom, and Siemens).

The participants agreed that the problem to be solved is to offer a unified range of services to the customer, without discarding the existing investments in hardware and software. Convergence will be met by interfacing different services through gateways.

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BANKING IN CROATIA/*(Continued from page 3)*

improvement is obvious for almost all customer communication and presales support elements of Croatian banks' Web sites. It it is, however, believed that users' interest in online banking will force Croatian banks to introduce additional online banking services, such as credit, life insurance, and brokerage transactions.

R&D IN SPAIN/*(Continued from page 2)*

researchers get is mainly dedicated to the provision of new infrastructure for the institution. It seems that the challenges to be faced with the new plan will be initially possible thanks to the public research effort, but if in the near future public researchers do not benefit directly from their collaboration with companies, a migration to the private sector that may be foreseen in the present and future stage of our research cannot be positive at all.

DIGITAL TELEVISION/*(Continued from page 1)*

Since the amount of cable used is very limited, the broadcasting situation in Spain allows for a large part of the market to be concentrated around DTT. Furthermore, Spain has the advantage of having much free spectrum, enough for 11 multiplexes in the long term, which offer over more than 40 TV programs, including national, regional, and local services.

Onda Digital (now Quiero TV, Spanish for "I love TV") is currently the Spanish company responsible for DTT transmission and covers about 80 percent of the national territory. It offers 13 free simultaneous channels and one pay per view (PPV) channel, all carried in six multiplexes. The contents of the free programs are diverse, containing cinema, series, entertainment, sports, news, and cultural programs. The subscription fee is about 28.6 Euros/mo (including the monthly rental cost of the set-top box). Top films are transmitted on the PPV channel with an extra cost of 2.4 Euros.

Quiero TV also offers Internet access through the set-top box and a telephone line. Access to the Internet is free, but not the telephone cost. To facilitate Internet access, Quiero TV offers a wireless keyboard for an initial charge of 30 Euros.

Around Europe, and specifically in Spain, the telecommunication liberalization process is just in a middle stage. Continuously, the political and financial strategies produce important changes in the telecommunications, telematics, and audiovisual market.s Therefore, the future of DTT is not clear yet. Stay tuned!