Global Communications Newsletter

October 1999

Mobile Communication Summit

By Giancarlo Pirani, Italy

Conference Objectives

The main objectives of the ACTS Mobile Communication Summit are to promote the dissemination of the ACTS mobile projects and the cooperation among different actors by highlighting the evolutionary status of mobile communications along the path of convergence with information technologies. The following objectives are pursued by the Summit through:

- The presentation and diffusion of technical papers reflecting the most important outcomes of the mobile domain projects as well as the technical positions of various actors from outside ACTS.
- The setting up and implementation of up-to-date scenarios by means of roundtables and panel discussions on key issues arising in the industrial world connected with mobile communications evolutionary trends.

The Summit topics are the most significant in the field of mobile communications, with particular emphasis on technological, radio, and network aspects as well as service and market trends from the perspective of third generation mobile communications.

The Summit took place in the transition phase between the fourth and fifth R&D framework. In this situation, not only ACTS project outcomes will be represented, but also R&D plans and early results achieved in the forthcoming framework.

To get the up-to-date information about the Summit, please visit the official Amos web site at http://mimobili.cselt.it/Amos.

The ACTS Mobile Communication Summit 1999 was held June 8th to 11th 1999, in Sorrento, Italy, and was sponsored and organized by the European Commission and supported by the ACTS projects in the mobility, personal and wireless communications domain.

Topics

The Summit accepted 150 contributions in topics that included:

- Demonstrations and trials (UMTS/MBS/WLAN/BRAN).
- Technology advances for mobile communications: software radio techniques and applications and radio technology.
- Multiple access techniques; multi-functional and multimode terminals; radio resource control and admission policies in a multimedia context.
- Regulator and band-assignment issues; mobile multimedia service forecasting and market policies.
- Network solutions and standard harmonization for advanced mobile communication; satellite for mobile services; wireless IP and wireless ATM; protocols for wireless applications.
- Service creation and control techniques; the client-server model.
- Radio and network performance evaluation; planning of advanced mobile networks.
- Security requirements and solutions in mobile communications.

The ACTS Program

Advanced Communications Technologies and Services, known simply as ACTS, is one of the specific programs of the "Fourth Framework" Programe of European Community activities in the field of research and technological development and demonstration (1994-1999). In fact, it is the focus of the EU's research effort to accelerate deployment of advanced communications infrastructures and services, and is complemented by extensive European research in the related fields of information technology and telematics.

ACTS builds on the work of the earlier RACE programs (Research into Advances Communications for Europe, 1985-1995), which were established to contribute to the "introduction of IBC, taking into account the evolving ISDN and national introduction strategies, progressing to Community-wide services by 1995."

Additional information about ACTS activities and the European Commission can be found at the following address:

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The Liberalization of the Portuguese Telecommunications Market

By Luis F. L. Bernardo, Portugal

The Portuguese telecommunications market has improved under the deregulation and liberalization process established and boosted within the European Union. Until competition began to arise with the authorization of the second mobile telephony operator (Telecel) in 1992, Portugal Telecom (PT) ran the market in a monopolistic way. Now PT is almost totally privatized and on January of 2000, the market will be fully liberalized. However, except for mobile telephony, Portugal Telecom still dominates the Portuguese Telecommunication markets today.

The main effect of the liberalization has been the reduction of prices to the consumer and the improvement of the service quality. The international service prices were reduced 67 percent (on average) as a result of the liberalization of the direct international interconnection at the beginning of 1999 and the strong cooperation from the mobile telephony operators. PT's international service provider (Marconi) is presently restructuring to adapt to the new market conditions and to optimize the profit potential of its deployed infrastructure of submarine cables to Africa and America and satellite links. A similar effect is expected in the market of fixed telephone service with the introduction of a new provider (E3G) at the beginning of 2000, especially for major clients. PT is internationalizing its operation is response to market pressures. Alone or associated with the Spanish Telefonica, it is investing in the telecommunication markets of Latin America, Africa, and East Europe.

The total Portuguese telecommunication market's revenue reached 3.6 billion Euros in 1998, and is expected to grow 40 percent during the next five years. The total investment in the period 1994–1998 reached 3.6 billion Euros and are expected to increase to 4.3 billion Euros in the period 1999–2003, focused on fixed telephony (60 percent) and mobile telephony service (29 percent). These two services represent 90 percent of the market's revenue, but are expected to decrease in importance with the development of cable TV and the Internet market.

Mobile telephony service has grown exponentially since its introduction in 1991. During 1998 the number of subscribers increased 85 percent, and the mobile phone companies increased their revenue by more than 125 percent. A new operator (Optimus) signed up 335 thousand subscribers after four months of operation. Today three operators share the digital mobile telephony market (the GSM 900 and GSM 1800 networks) with a total of 3.07 million users, which represents more than 30 percent of the population. The market shares were, respectively: 45.5 percent for the PT subsidiary (TMN); 43.7 percent for Telecel; and 10.8 percent for Optimus. The analog mobile network is used by only 1900 subscribers, and will possibly be disconnected in the future. The number of pager service subscribers is decreasing since 1997, and on December 1998 it had 264 thousand subscribers. The fixed telephone network presently has 4.1 million lines, but this number has also been decreasing since 1997. The number of mobile telephony service subscribers is expected to exceed those from the fixed network during 1999. Clients are adopting the mobile telephony service as the main voice service.

More than 80 percent of mobile telephony service clients are subscribers of the prepaid service. The prepaid service was introduced wordwide in the Portuguese market in September 1995 by the PT subsidiary (TMN). Today all three operators have a variety of prepaid packages, with different time costs and pay periods. The availability of a widespread unified banking network that supports service payments has allowed the introduction of other prepaid services, including Internet service subscription and toll tele-payment. For instance, the BRISA's toll tele-payment system is the most successful one in Europe, with 650 thousand subscribers on a total of four million cars (16 percent).

The fixed telephone service is starting to change its main market, from voice to data and multimedia. The new fixed phone operator E3G is formed by the electrical and gas distribution companies, and will use most of its already installed telecommunication infrastructures covering the entire country (including SDH optical-fiber networks). It plans to invest 500 million Euros during the next eight years. Besides the voice

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Scandinavian Telecoms Taking Over Lithuanian Market

By Algirdas Pakstas, Lithuania

The Scandinavian telecoms' taking control of the Lithuanian market was predictable since Tele Denmark was seriously thinking of dropping the Lithuanian market after its unsuccessful attempt in June 1998 to buy 60 percent of the shares in the then privatized Lietuvos Telekomas for US$500 million. Moreover, Scandinavians were among the first to explore these waters since 1991, when Lithuania restored its independence from the Soviets.

In January 1999 Tele Denmark bought from Millicom International Cellular SA (represented by Millicom East Holding, The Netherlands) 35.8 percent of the shares in the operator Bite GSM. Danes also bought 24.5 percent of the shares in Comliet, another mobile phone operator in Lithuania. Tele Denmark now owns 71.6 percent of Bite GSM shares and 49 percent of Comliet shares.

After this deal Scandinavian companies have very strong positions in Lithuania. The controlling share in Lietuvos Telekomas, which is a fixed link monopoly, as well as in Omnitel, which controls 50 percent of the mobile telephone market, belongs to the consortium of Telia (Sweden) and Sonera (Finland).

Thus, Tele Denmark has become the primary rival for this consortium in Lithuania because Bite GSM brought a share of 40 percent of the mobile telephone market.

The reason Tele Denmark did not purchase 60 percent of the Lietuvos Telekomas shares in 1998 was the condition that the rest of the shares, when available, must first be offered to Tele Denmark. This condition was unacceptable to the Government, so Tele Denmark offered another price — US$1 for the stock that was turned down in favor of US$510,000,000 offered by the Telia-Sonera consortium.

The number of mobile telephone subscribers in Lithuania grew in 1998 to 328,400, which translates into one out of every 11 people having a mobile telephone. This represents significant growth since the end of 1997, when only 157,000 subscribers used mobile telephones (one out of every 23 people). It is still a long way from the penetration level of Finland, where there are 56 mobile phones for every 100 people and ten percent of the population uses the Internet. However, we need to recall that in the years between World War I and World War II the Lithuanian economy was in better shape than the economy in Finland and Norway, where the population in both countries is similar in size to that of Lithuania.

France Telecom Perspectives on Voice over IP

By Pierre Rolin and M Dudet, France

Telephony over IP is currently among the most debated subjects. Not a day passes without a new product announcement, an operator announcing initiatives and experiments, an ISP claiming that its voice service is open, or an economist arguing the death of POTS (plain old telephony services). Such a chorus should convince traditional operators to abandon their telephony infrastructure in favor of IP technology. Statements made over the last year mostly emphasized the new value-added services enabled by voice over IP rather than pure substitution of POTS.

The low cost of IP technology used to be presented as the killer argument. This is currently based on the fact that the IP model is more similar to the mass media than an end-user-funded service. This works perfectly well for screens partially covered with commercials, but can you imagine your telephone communication scattered with commercials! There is certainly room for cost reduction in telephony, but IP is not the key factor here.

Digitized voice has been understood for more than 30 years as the future of telephony. ISDN was the first step in this direction, and GSM has proven its superiority versus analog technology. Nevertheless, none of those technologies have abandoned two very basic principals: circuits and continuous flow. IP breaks those two old principles, as it aggregates voice sampling in datagrams sent separately on the network. The first experiments in the 1970s showed on Ethernet that it provides a better multiplexing efficiency than circuits, but conversely is not able to provide a stable voice quality restitution.

New compression algorithms in the 1980s led to more economical advantage with increased multiplexing gain. In the 1990s global Internet development and economical usage shows that data will significantly surpass voice on the backbone network. Integrated network services, being France Telecom's target, should be profitably based on the technology that carries best the major traffic. Obviously IP technology, meanwhile, presents opportunities to design new value-added services, such as Web-enabled call centers, that were not even feasible without the convergence of telephony and data.

IP telephony technology principals and feasibility are now proven to some extent. H.323 coding algorithms have been given a large consensus. Many commercial products exist and many more are being developed. Mobile telephone users experience and accept lower voice quality than POTS. Also, next-generation voice over IP services need not be as reliable, may not provide the same level of QoS, nor work together as well as the telephone network France Telecom has built over the past 100 years if there is a significant reduction in tariffs. This must still be confirmed by field trials that take into account actual costs and a broader population than just the early adopters.

Moreover, voice over IP is still hindered by a number of problems, including: architecture (location and function allocated to gateways/gatekeepers); capacity management; assured QoS to users (e.g., IntServ and diffServ at IETF); POTS integration (PBX, subscriber loops, signaling Q.931); scalability; migration path; and address matching. Standards still need to be formalized and completed. Laboratory testing for interopability, as well as evaluations of products and services, need to be performed by France Telecom before full realization of the potential of IP telephony can occur.

IP telephony services should operate wired and wireless transmission media, as do current real-world networks, in homes, home offices, complex office facilities, and community services. France Telecom is willing to actively participate in international initiatives promoting interoperability, such as

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A Report on wmATM'99

By Willie Lu, U.S.A.

The IEEE wmATM '99 workshop was held in San Jose, California from June 2 to June 4, 1999. Willie Lu, general chair and founder, addressed the opening of the workshop, stressing the significance of wmATM technology in the third-generation wireless communications as well as broadband wireless access systems. By using wmATM as the wireless core pipe, an open software defined radio platform can be constructed for the base station and wireless terminal.

Dr. Qi Bi, technical chair, analyzed the features of ATM for the wireless applications compared to IP technology, and pointed out that wmATM has great potential to apply QoS in wireless mobile communications. Wireless performance issues with wmATM were also addressed in his talk.

Dr. William Lee, co-chair, illustrated the importance of wmATM in CDMA networks, including the backbone network for inter-MSC transport and services. Dr.Lee also mentioned that wmATM can help simplify network management and network planning.

Lou Dellaverson, chair of the ATM Forum WATM working group, described universal wireless access using wmATM technology as well as the evolution of the WATM standardization process.

Official technical sessions started on the morning of June 2. More than 30 authors from all over the world presented their original contributions to wmATM development. Most of them came from major telecom industries and research institutes that have been actively involved in this field. Their topics cover medium access control, modulation, handover, performance analysis, admission control, congestion avoidance, channel management, mobility control, signaling stack, QoS control, software radio, and network optimization, as well as third-generation wireless issues. Compared with the previous wmATM workshop (wmATM '98), this event greatly promoted the wmATM applications solution to construct the broadband packetized open wireless pipe with guaranteed QoS for enhanced third-generation wireless and broadband access systems.

wmATM '99 also served as the annual meeting to keep all members updated about the newest developments in advanced wireless communications. Mr. Bartolome Arroyo from the European Commission reported on the newest wireless framework and ongoing projects in the union, and extensive discussions were initiated among participants.

During wmATM '99 the committee also spent time in planning the next workshop, which will be a partial function of the IEEE 3G Wireless Conference (3Gwireless.com). All the attendees showed great interest to meet again next year.

Thanks to TF-wmATM/Delson in organizing this important wmATM event. Acknowledgment is also given to those who sponsored relevant activities during the meetings, including Lucent and Infineon.

PORTUGESE TELECOM MARKET/*(Continued from page 2)*

market, it already participates in one of the mobile telephony operators and plans to also participate in the Internet and cable TV markets.

Cable TV and the Internet will be important markets in the future. They are presently dominated by PT subsidiaries, and shared with small companies with low investment capacity. However, with the liberalization of the interconnection network, major companies with strong investment capacity and deployed infrastructures are preparing to also enter these markets. The ISDN market is also expected to continue to grow. Today PT has 314 thousand ISDN subscribers.

At the end of 1998, PT controlled 95 percent of the cable TV market, which had 596 thousand subscribers (14 percent), with an infrastructure that covers 44 percent of the households. The cable network is used mainly as a broadcast medium, with the exception of low bandwidth Internet services (64 Kb/s) introduced recently. The introduction of high bandwidth cable modems (xDSL) and digital television promise to turn the cable TV operators into major players in the local access loop, competing directly with the fixed network operators.

The PT Internet service provider (Telepac) controlled 75 percent of the Internet market at the end of 1998. There were 144 thousand individual subscribers (less than 3 percent of households) and 28 thousand corporate subscribers, and 10,000 hosts registered (excluding the university and research network). This market has doubled in size every 10 months, and is expected to experience the biggest growth in the next few years.

A complementary academic network for research and development (RCCN) is financed and managed by government funding. RCCN connects the universities, libraries, research institutes, and the all the secondary schools (more than 2000 entities). The network has 22 PoPs distributed throughout the country. It is connected to the European research network Ten-34/155 using a 10 Mb/s link and is connected to the other Internet hosts using a 6 Mb/s link.

FRANCE TELECOM/*(Continued from page 3)*

ETSI/TIPHON or iNow, and is currently implementing a full range of field trials covering various market segments. Some of those actions should be conducted within the fifth PCRD framework, or may require some Eureka-like action to unite European operators and telecom manufacturers.

The fact that fully IP-integrated services (data, voice, and video) are not immediately possible on a large scale should not prevent partial services being offered to "educated" customers or the testing of new services in field trials. To this end one should consider telephony over IP with a different viewpoint according to where voice is digitized/packetized and what level of QoS is expected. In other words, is the user aware that his communication may not be as fluid as he is used to? A Web surfer is aware that multiplexing his communications might provide some defaults and may accept them as a way to save money. A traditional telephone user may not accept quality degradation due to technical choices made by the operator, even with significant fare reductions. A company may chose to use IP telephony for internal purposes as the LAN technology used can provide cheaper service than PABX integrated services. They will then transmit their communication through private IP channels between sites. Nevertheless, they also would appreciate not having to buy and manage a gateway to access the operator's networks.

In conclusion, global IP telephony interoperability and scalability, as well as human factors, are key issues in making IP telephony a reality. Nevertheless, before global solutions are available, partial solutions will be proposed to knowledgeable customers, and field trials will be performed to help the emerging VoIP services grow to maturity both on the operator's side and on the user's side.

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