

### EDITORIAL BY GÜNTER KLEINDL, CHAIRMAN ETSI PROJECT DECT

## DECT for ISDN and Data Services

This issue of the DECT Forum News Letter is devoted to DECT data and ISDN applications. While speech products have been dominating the first years of digital cordless equipment in the market, DECT has been structured from the very beginning to allow a wide variety of data services which now, with the success of ISDN and Internet, are becoming available to all customers.

DECT offers an extremely flexible air interface, which is designed to access a large number of networks. For the interconnection to ISDN, ETSI have produced two profile standards that define how ISDN services can be accessed via DECT.

The first one defines how DECT-specific terminals can offer ISDN services. The second specifies how standard ISDN terminals can be connected via a transparent DECT-link to the ISDN network. The latter one is especially used for applications like Wireless Local Loop.

Due to the ever-increasing demand for faster data transmission, we now have included additional modulation options in the 1998 edition of the DECT standard. This enhancement allows for high-speed up to 2 Mbit/s while at the same time guaranteeing full backward compatibility. Equipment, which does not support the high-speed option, can still communicate by using the standard mode.

The unique concept of profiles as employed by DECT now offer a variety of possibilities for all data communication needs ranging from LAN or X.25 applications to Internet PPP access. Many of those are available or close to finalisation.

DECT already supports wireless access to ISDN and the world of data and I am convinced that DECT is well designed to meet the communication challenges of the next century.



### The DECT Forum Mission

*DECT Forum is an international organisation formed by leading telecom operators and manufacturers. DECT Forum has representatives in all the major geographical regions.*

*DECT Forum provides a unique platform for the exchange of experience between users, operators, regulation and standardisation bodies to ensure the sustained growth and acceptance of DECT world-wide.*

### MORE THAN A WIRED CONNECTION CAN DO

## DECT, the Wireless Internet Provider

The Internet revolution has extended the need for data services to all sectors of the community and to provide them in the Wireless world is a key argument for DECT. Of course, Internet (e-mail or Internet/Intranet browsing) is not the only telecommunication application which needs data communications, as data is also needed for fax, remote access to corporate LAN's or for usual File Transfer but, today the Internet is clearly the main driving force behind the data services take-off. DECT, as one of few radio interfaces which provides Wireless Internet Access, can answer the customer expectations at home, in businesses and in public access. The structure of DECT can provide packet or circuit connections as well as low or high speed data.

Cordless systems are suited to provide access to data applications, adding the benefits of ease and quickness of installation, low investment or mobility. This is the case especially when using data adapted interfaces, as DECT is. The standardization of a range of data profiles and the specific use of Dynamic Channel Selection for data makes DECT one of the best air interfaces designed for multimedia applications with the same quality of service as from wireline access systems.

DECT technology can provide techniques which enhance the efficiency of Internet and data access in Wireless environment. The solution for

copied with different requirements is the availability of different DECT Data Services Profiles (DSP) which can be combined together with voice or used separately. DECT standardization in ETSI, has made possible Data Profiles which include the definition of circuit and packet mode service over the DECT air interface, as well as interworking features with both connectionless and connection-oriented data networks. What are the needs for Data connections?

Internet-based applications are based on asymmetric traffic, packet oriented communications, long sessions with variable load of information flow. Internet applications require capabilities which take benefits of these characteristics. These packet oriented based applications can be provided easily with DECT.

Traditional data applications like fax and remote Point of Sales login via modem connection, mainly need symmetrical connections with circuit oriented communications, on relatively short calls, low bit error rate and protected communications. These application based on dialing and connection oriented circuits can also be provided easily with DECT.

DECT provides both circuit and packet connections allowing the benefits of high quality circuits, low bit error rate or spectrum efficiency for high user density, enhancing these features with a wide

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## New Frequency Allocations

Panama has officially allocated the band 1910-1930 MHz to Fixed Wireless Access with TDD systems, which will allow the deployments of DECT networks.

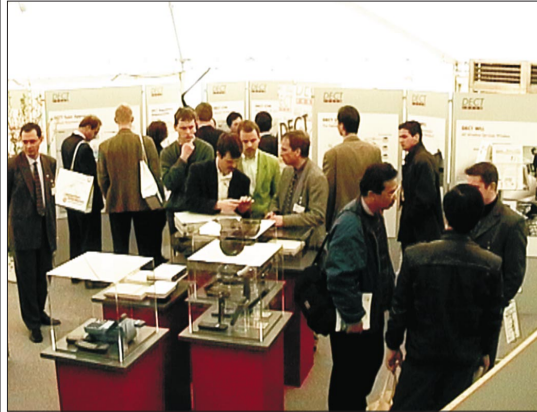
Mexico has now published the band 1910-1930 MHz for Public Wireless Access. This decision follows a long and careful study of all the technical and economical aspects, and opens the door to the use of DECT for Wireless Local Loop in this North American country.

The 1910-1930 MHz band has also been allocated, beginning of June, by the SUBTEL of Chile, for Fixed Wireless Access and Wireless PBX using TDD technology. Trials have already been performed with DECT in Chile and this will allow a quick development of DECT Wireless solutions."

Following the recent allocations in Latin America, 1910-1930 MHz frequency band allowing the use of DECT has now been allocated in Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, El Salvador, México, Panama, Paraguay and Uruguay. Additionally, several successful trials have been performed in Brazil. Finally, Peru and Venezuela are currently studying its allocation.

## CEBIT'98 REVIEW

At CeBIT'98 from 19th to 25th March 1998, the DECT Forum presented the capabilities and prospects of the DECT Technology. The booth which was located in the open air fairground was visited by many hundreds of visitors. DECT Forum Board members and experts from DECT Forum member



companies could be addressed directly and many interesting personal discussions were held. In a number of press interviews, the benefits of the DECT technology could be explained to journal-



range of additional services.

DECT packet mode services have a number of advantages that make them particularly suitable for providing Internet access. The air interface is only used when data is transferred. The concept of a "call" is retained, while at the same time the radio resources are only occupied when data has to be transmitted. This means that when a web surfer is just looking at a screen that has already been retrieved from a server, no radio channel is allocated to that communication. However, at the same time a "session" is kept alive on the control plane between that user and the Service Provider. DECT can provide this simple, but powerful feature for Internet Access Providers.

Another important feature provided by DECT is asymmetry, that is, that upstream and downstream data rates can vary independently during a call. This is particularly interesting for the Internet, since information transfer is normally unidirectional and higher in the downstream than in the upstream direction.

Finally, the DECT Data Profiles allow a Bandwidth on Demand concept with 23 time slots to be concatenated in one direction, giving a peak bit rate of 552 kbit/s of protected data transmission. Bandwidth can then be dynamically assigned based on the available spectrum and traffic load.

These characteristics of the air interface show

ists from Europe and abroad. Panels informed the visitors about the many application areas as well



as the worldwide success of DECT. This information has been compiled into a General Presentation which those who were not able to visit us during the fair can study at our Web Site <http://www.dect.ch>.

Outside the DECT Forum Booth, visitors could witness that several dozens of suppliers presented their new DECT products for all private and public applications. For the first time a number of data, ISDN, and multi-media products were presented.

CeBIT visitors were convinced that DECT voice and data products in all areas of applications are more prominent than ever and that this technology will enjoy a bright future.



how DECT is well suited for Internet providing the end user with powerful capabilities at the Connection point:

User interface types can be similar to those used for Leased Line services like PPP protocols or direct IP control. The use of adequate transmission techniques provides, as described, better usage of the air resources. Internet's most spectrum efficient solution is packet transmission which provides a packet switching mode operating at layer 2 of the communication stack model. Both virtual call and permanent modes are possible.

Packet Mode is also available on ISDN over DECT: in the B or D Channel (IIP profile), this ISDN service transfers packetized user information over a virtual circuit within a B or D channel of the Basic Rate (BRA) Interface. Both virtual call and permanent virtual circuit modes are possible. Signaling information for virtual calls and possibly Operations, Administration and Maintenance (OAM) information for permanent virtual circuit services are transferred via a D or B channel. Speeds of up to 16 kbit/s (D Channel) or 64 kbit/s (B Channel) can be reached.

Additionally to the packet data connections traditional data circuits and ISDN connections can of course be provided easily – Voice Band Data (VBD) services on analog connections can be used.

ISDN connections, BRA interface, provide full transparency for ISDN services to terminals connected generally to the S/T bus. The user interface is normally a BRA 2B+D Interface plus some extra capacity for physical layer management and other purposes. For ISDN 64 kbit/s Unrestricted Digital Information, which is provided by ISDN networks, an end-to-end digital connection is required. When used for data applications, each of the two B channels provide a 64 kbit/s Unrestricted Digital Information (UDI) transport capacity which can be used, in the circuit mode, to provide two independent connections or one combined 128 kbit/s connection. Unrestricted means that any binary combination can be included in the user data flow, and thus implies that

end-to-end digital transparency must be guaranteed.

In conclusion, different DECT air interface data connections can be provided depending on the interface, speed and type of service required. Some of them are adapted to a high density of Internet users while others cope with the needs of less data oriented networks. Based on these interfaces, Access to different networks is given using either a subscriber line, V5.2 protocols with the switched network, or direct connections for the case of data and Frame Relay networks, which can efficiently handle high speed, bursty data over wide area networks. All the features allow us to say:

*DECT, the Wireless Internet Provider.*

## DECT AND ISDN

### The Optimum Solution

**The rapid extension of the ISDN network generates a growing demand for ISDN devices - both mutually influencing each other. Based on the standardized interworking capability of ISDN and DECT, especially DECT ISDN telephone products are increasingly successful, because they provide a powerful and comfortable combination of ISDN supplementary services with the benefits of DECT for an economic price.**

Typical target groups are the SOHO (Small Office Home Office) and the high end residential segment. More than half a million sold DECT ISDN telephones in Europe and further regions in the world are showing the growing success of such products. Mainly in Germany, where over 2 million ISDN basic rate accesses were installed, demand is increasing. In other European countries like the Netherlands, in Scandinavia (especially in Norway), Great Britain, France and Italy DECT ISDN telephones have a remarkable market potential. Customer interest is also noted in eastern Europe like the Czech Republic, Poland or Russia as well as in regions as for example South America, Hong Kong and South Africa.

Why is it so attractive?

DECT ISDN telephones are offering a lot of benefits to their users like easy installation, high degree of mobility and personal availability. The user receives the advantages of a fully digital connection by a very fast call setup, excellent speech quality, plenty of supporting information displayed and a maximum of security.

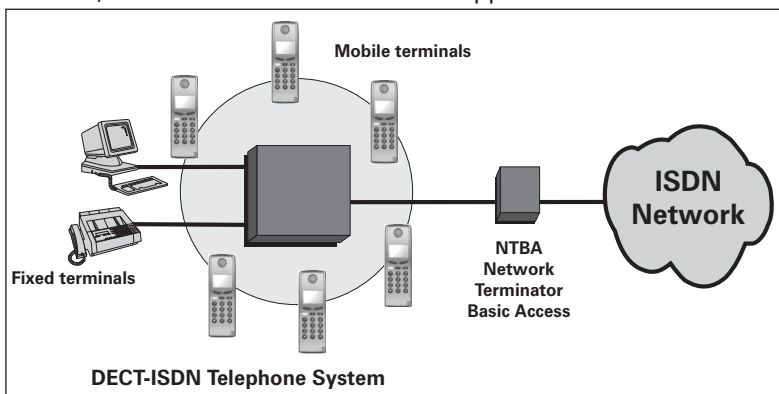
DECT ISDN telephones have the characteristics of small PBX systems – thanks to DECT. Several internal subscribers can be operated behind such systems, for each of them an external number can be allocated. That way each registered subscriber can be called directly from external. This and other features like call waiting, missed callers list and automatic call back are providing a high level availability.

A high traffic rate (e.g. 2 external and 2 internal calls at a time) can be achieved. Internal calls are free of charge. Comfortable number or name dis-

play and a number of status displays extended with the variability of call tones are showing the transparency of ISDN signalisation, easy to understand and to use.

Usual PBX-functionality like call hold and call toggling, three party conference and call parking are available not only behind DECT ISDN systems but also in the ISDN network, which extends flexibility and freedom enormously!

To summarize, ISDN and DECT are technologies complementing each other in an ideal way and the progress has not yet come to an end, more over it has just begun! DECT ISDN telephone systems can be extended to a perfect center for telephone, data and multimedia communication both for home and business applications.



### The Intermediate System

ETSI has also developed a comprehensive specification describing the so-called "Intermediate System", a system delivering ISDN services over the air. The primary application for such a system is the local loop, but a few others are envisaged which might help to establish the DECT Intermediate System configuration in other areas. With the Intermediate System, usage such as ISDN access to the Internet, videoconferencing via ISDN and data transfer at 128 kbit/s, becomes "cordless", without the need for wires between the operator's ISDN network termination and the application.

The example shown in the figure shows how videoconferences are possible in whatever location needed. Internet access in the backyard becomes a reality, moving inside the building is



## Forum Members

### New Full Members

RTX A/S Nørresundby,  
Denmark

Wandel & Goltermann,  
Eningen, Germany

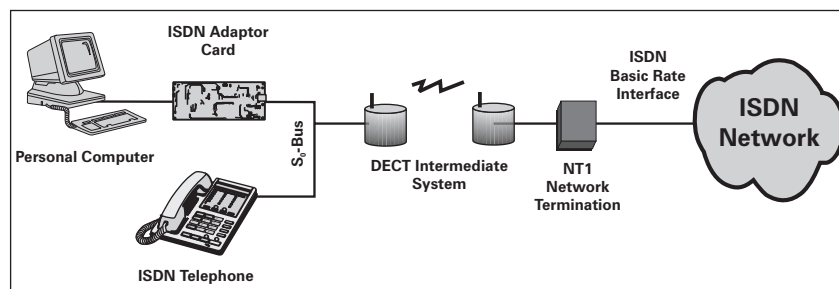
### New Associated Members

Arther D. Little Cambridge  
Consultants, Cambridge,  
U.K.

easier, and drilling holes is no longer needed to set up the local ISDN cabling.

The beauty of the configuration above is its simplicity: All ISDN applications, those of today and

DECT technology is proven and manufactured in millions of units per year. Consequently, equipment costs - notably for the SoHo environment - are low. Investments in a product like this will have



to be justified against the cabling costs: These would become prohibitive especially for customers migrating from PSTN to ISDN where the existing environment is made of only 2 wires.

In summary, DECT and ISDN are complementary technologies, both can

those still to be invented tomorrow, will benefit from the fact that wires are not needed anymore. In other words: Future proof!

This example highlights just one particular configuration: DECT is "only" used for transportation. The next step in product developments will be an integrated Intermediate System together with GAP (Generic Access Profile) connectivity, data services and cordless terminal adapters.

benefit from each other. Their combination encourages new applications, which lead to additional demand. The possibilities are unlimited: Data applications co-exist with voice or video applications, Internet access as well as Fax Group 4, telephony as well as data transfer - all applications become "cordless" thanks to a very simple DECT product.

## DECT DATA SYSTEMS

### A Virtual Cable Using DECT Technology

**DECT has been one of the most prominent technologies in the telecom marketplace over the last two years. So far, the many manufacturers have concentrated on developing new telephones for the residential market. As their first projects come to an end, these manufacturers are looking to be first in the market with the next convenience "must have" electronic products. They started recently developing small business systems using DECT, and secondly - in recognition of the increasing data traffic in a small business - cordless phones designed only for data.**

The benefits of a small business cordless system are easy to see, never being tied to a desk, improvements in reachability and consequent improvement in customer service are two that are often mentioned.

There are equal benefits for data systems: Consider walking into your office with your laptop, and being able to print without plugging your laptop into a cable or requiring an expensive docking station. Consider being able to set up your PC for an Internet connection without having to move the furniture around or run another cable to the telephone socket. Consider being able to move cash registers around a shop floor without having to think about the communications cabling. All these may sound familiar conceptual dreams, but in the past the devices that allowed such applications were expensive and required a high level of expertise to set up. A new generation of DECT data-only cordless products appearing in 1998 will rapidly reshape the way that we work in many ways, bringing all the convenience and comfort of the cordless phone to our interaction with the PC and other data devices. Also enabled by this concept are thousands of proprietary systems in industrial and retail applications.

Many countries outside Europe have allocated frequency to DECT, so the concepts mentioned

here can be used in these markets without complicated or expensive licenses. Nor do the systems require complicated installation planning, so they can easily be installed by anyone that can plug in an ordinary telephone. The capacity of the DECT system is high enough to operate at full performance in even the most densely populated areas.

Systems integrators who consider addressing the opportunities in this market may now use standard silicon components. The chips (usually requiring the longest development time) are already well established in voice applications, and now the software for the first data applications is also available. The concept is very simple, allowing designers or users of any device (for example a PC printer or modem) to attach a radio to the port instead of a cable, and convert their product into a cordless one. The product is transparent, in other words it sees all the devices it would have seen if a cable was there instead. All the software can be left unchanged, so any user who is capable of correctly plugging and unplugging a cable can install the products. All the communication between the devices is digital.

The idea behind this "Virtual Cable" DECT data system is that you can take a normal cable connection from a PC or other electronic device and change it to a radio one. The device sees a cable, but the cable is no longer there. It is just two Virtual Cable units, one at each end of the imaginary cable. The concept allows device makers to choose their interface to the outside world, so connection to RS232, USB, or PCMCIA is simple. The approach is to offer a transparent data transfer so that the designer can concentrate on adding wireless functionality to their system without acquiring any understanding of the technology involved. Users can start to be much more adventurous, and can have a lot more flexibility in the sorts of things that they can make, services that they can offer, and applications that they can develop.