MOBILE COMMUNICATIONS - A BRIEF OUTLINE

"Pre-cellular - System 4"

Until 1985, the only two-way mobile communications service available to the public was the radiotelephone system run by British Telecom. The most advanced service of this kind was called System 4 and is still in use, although its use is declining. The technology used meant that the equipment was bulky, but more important the capacity of the system was restricted by the limited number of radio channels available and the way those radio channels were used in System 4.

Cellular Radio

The radio spectrum, particularly in the lower frequencies for which equipment had been developed up to that point, is a very scarce resource. If mobile radio was to become a mass-market product, some way had to be found of fitting more users into a smaller amount of radio spectrum. One way of doing this was to limit the power of the transmitters so that the same frequency could be used nearby. However, a wide area of coverage is essential to many business users of mobile radio. The solution to this problem was cellular radio.

In the cellular system, radio coverage is provided using a number of cells, which can be as small as one kilometre across in city centres and as large as 15km or more in rural areas. Each cell is surrounded by other cells operating on different frequencies, based on a pattern similar to that shown at figure 1. Because relatively low powered transmitters are used, and because of the higher frequencies employed, the same radio frequency can be used many times across the country without interference being caused between users.

When a user in a car, for example, moves towards the edge of a cell, the system detects the weakening signal and transfers the call to the next cell. This process is known as "handover", and is not normally noticeable by the person making the call. Because of this facility, cellular radio equipment, at both the network and the user end, needs to be more sophisticated than radio networks like System 4.

In 1985, the Government licensed two national operators, Cellnet and Racal-Vodafone to provide a cellular radio service in the UK. They have been a major success, with more than 500,000 subscribers and coverage of areas in which more than 90% of the population live. The next step in cellular radio will be the establishment of a pan European cellular network. This is often known as the GSM after the group responsible for establishing the standard. Service is planned to begin in 1991.
Telepoint

Cellular radio is ideal for people who have a need to stay in touch at all times. But it is too expensive for everyday use by the man or woman in the street. This is where Telepoint comes in.

Telepoint is based around the familiar cordless phone which many people have in their homes. But as well as being able to make calls from home, the owner of a digital cordless telephone - a CT2 phone who also becomes a subscriber to Telepoint will be able to make outgoing calls using the handset from within 100-150 metres of a Telepoint base-station located in a public place like a station, airport, shop or pub. These base-stations will be operated by the four companies which have been licensed today, who will also sign up and bill customers using their networks. Because the area covered by each Telepoint base-station is much more limited, a very small amount of radio spectrum serves to cover a large number of sites across the country.

At present there are only two CT2 handsets available, made by Ferranti and Shaye. Others are under development. A base-station designed for use with one will not necessarily take calls from the other. But by the end of 1990 operators will have to provide facilities for handsets using a common standard known as the common air interface. This is being developed by industry and will allow a user to change operators without changing his handset and, when arrangements are fully in place, to use all the operators' base-stations while subscribing to only one of them (in the same sort of way as customers of one bank are able to use their cards in another's automatic teller machines). Other countries may adopt the same common air interface.

The Future

The future of mobile communications moving into the 1990s is very much in the hands of industry. The discussion document published today identifies the area of the radio spectrum most suitable for the next stage of development and puts forward some of the Department's initial ideas. These involve the gradual coming together of cellular and Telepoint, based around cells larger than Telepoint, which may or may not incorporate handover. This could be the point where serious competition to the 20 million fixed telephones might begin.

For the business user this offers prospects of a light, compact and relatively cheap "office in the pocket". The domestic user could have a phone which can be slipped into a pocket or handbag and carried around within the local neighbourhood. It could be used to make and receive calls free from the need to be near a fixed phone or public call box.

This is one possible sketch of the future. Industry, operators and others in Europe and elsewhere will no doubt have their own ideas. The shape these longer-term networks will have, the technology they will use and the market they will serve will be very much for the customer to determine.

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