

Technology

Sunny Brighton played host last week to the Communications 76 exhibition and conference. Our computer correspondent, Hedley Voysey, reports on a "bike-in-the-shed" computer terminal, and Duncan Campbell probes the military connection

Updating the electronic eavesdropper

A wide range of systems for monitoring and recording radio communications was a distinct feature of the Brighton show. One of the most sophisticated and costly computer-based systems, called Ceres, was unveiled by Redifon Telecommunications. Ceres uses a small computer to provide remote control scanning and recording of up to several dozen receivers; reducing, it is claimed, the amount of skilled manpower necessary in this highly specialised clandestine field.

The Computer Enhanced Radio Emission Surveillance System was developed under a contract placed four years ago by an unspecified British government department. Government Communications Headquarters (GCHQ), a section of the Foreign Office, is known to be involved in running a world-wide network of electronic listening posts. The need for a new computer-based system is reportedly related to a shortage of radio operators, as many of those recruited during and after the last war reach retiring age.

Each Ceres console, of which a dozen have been initially ordered by the government, provides manual and computer control of four radio receivers at present covering the high frequency radio band,

The receiver may scan continuously a particular part of the spectrum for activity or maintain watch on a set of discrete channels. Another technique, more useful in overt activity such as recording news broadcasts and press agency dispatches, is the facility to preprogramme the times of monitoring each channel. A typical monitoring installation would include six such consoles and a supervisor's position for assigning priorities.

Associated with the receiver complex is a purpose designed tape recorder called Keepnet, which records up to 64 minutes of monitoring on each of four channels, enabling the capture of short signals and their later transcription at a time of little activity. The tape loop is held in a "scramble bin" and can be scanned at very high speed, stopping when activity is found on a particular channel. The Keepnet equipment was developed by Racal for a similarly unspecified government department.

Redifon's Ceres and similar systems are designed for use with remotely tuned and controlled radio receivers which can, if necessary, be connected over telephone lines. A particular advantage of computer-controlled systems can be for

locating the position of clandestine or hostile radio transmitters.

Location is done by direction finding (DF). Normally a series of DF stations have to be contacted manually and given information on the signal before measuring bearings, with considerable risk of loss of a short duration signal. With a computer-based system, the data network linking monitoring radio stations may be used to transfer the request for a "fix" rapidly, and automatically.

Although the Ceres equipment is expensive, costing from £200 000 to £1 million for a single monitoring site, Redifon hopes for considerable export success. It is rapidly becoming unfashionable for Middle Eastern and African countries not to be equipped with such electronic surveillance systems. As well as military users, an Arab news agency is considering using Ceres for pre-programmed reception of news broadcasts. □

Plessey unwraps the army's STD

The results of a £30 million effort extending back almost 20 years to develop a versatile automatic battlefield telephone system were displayed for the first time at Brighton. Ptarmigan, developed by Plessey, will be in operation in the early 1980s, providing the army and RAF in Germany with a versatile trunk telephone system which is widely dispersed and highly mobile.

The development of Ptarmigan, according to Brigadier J. Akass in a paper given at the parallel Institution of Electrical Engineers conference, goes back to a joint Australian, Canadian, US and British proposal in the 1950s called Hobart, which later evolved into a specific proposal for a similar point system to be called Mallard. Mallard was sunk in 1969 for internal political reasons in the United States, and as a result Britain proceeded on its own with Ptarmigan. France, Germany and the US all have similar, but not entirely compatible, systems currently under development.

At the heart of the Ptarmigan network are some 20 electronic stored program control telephone exchanges using digital switching. Each exchange is mounted in a single truck, and moves around with a group of six or seven associated radio relay trucks. Each of these may provide a multichannel link to another trunk node or switch, or single channel radio access to individual Ptarmigan "subscribers" via

secure encoded radio links. Since all transmission inside the system is digital, encyphering signals electronically is relatively easy and is done directly by a purpose-built integrated circuit built into each subscriber terminal.

Each subscriber has a unique and unvarying telephone number which directly corresponds to his division and status in the military hierarchy. The system is designed so that any arrangement of subscribers and switches is allowable, with a high degree of interconnection to render the system comparatively invulnerable to damage or failure. When a number is dialled, a search is instigated which finds the parent switch responsible for that subscriber. The call is then set up, and the route remembered if the subscriber is called frequently.

Each communications centre is designed to be highly mobile, and may move position every two hours, depending on the "set up and tear down" time.

An important concept is the wide dispersion of all the component parts, which together with fluidity of operation makes Ptarmigan resistant to damage; there will generally be at least two paths to any subscriber. As well as being intelligent in comparison with the civil trunk network, it will also provide subscribers with push button dialling, conference and broadcast calls, priority calling and data, telegraph, or facsimile transmission. □