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RADIO AREA COVERAGE - PART II

By: P Taylor

The use of VHF radio as a means of speech communication between a fixed point and a mobile one can certainly be viewed as commencing in the early 1940s. In the wartime it was used firstly for the control of combat aircraft over distances up to 100 miles or more, depending upon the height of the aircraft, and later for point-to-point or mobile use on the ground, such as isolated sites, tanks and mobile military units for example.

When used with a ground mobile the range of a fixed site is limited to a distance which exceeds the visual horizon by a small amount. This distance can be as small as five miles or as large as fifty miles depending upon its height and location. It follows that when one considers the area of cover on a site for fixed to mobile ground communication we are faced with an average area of about 300 square miles. In contrast the airborne mobile would find the area of cover to be 100 times larger.

Thus it is obvious that the problem we face is greater than for aviation communicators. If one considers the area policed by the Thames Valley Force we have over 2000 square miles and a mathematical calculation suggests that seven sites are required to give satisfactory cover; this is one more than the figure produced by a full survey of the area.

The multi-carrier AM transmission system which this department has used since 1948 enables up to three or occasionally four sites to operate within the compass of a single mobile receiver with reasonable but not perfect results. However, an attempt to increase the number of sites results in poor or impossible communication.

In the case of the force mentioned six sites are needed to cover the area. There are cases where the area has not increased but improvement in the quality of the cover is necessary; both situations can be met only by additional sites or an increase in output power.

Taking the latter proposal, in the last ten years the department has placed more powerful transmitters on a large number of sites and cover has improved; but the limitation of this technique can be summed up by the phrase "multiply no signal by any number and the result is still no signal".

The former proposal opposes national policy which is intended to limit the proliferation of sites. As a result we have successfully carried out joint site development with other authorities. However, the major problem is the one of engineering, referred to earlier, and may be overcome as follows:-

Firstly, the division of an existing three station scheme into three separate stations capable of independent operation, with the option of combining the stations for full broadcast of messages. Likewise six stations could be divided into two groups of three or three groups of two in the same manner. Either procedure increases the message capacity of the scheme but the complexity of the mobile equipment is increased and the man in the car would have to select the channel that corresponds to the area he is working. Future development of automatic switching systems could improve the performance of the stations when they are combined, but in the divided state they would still require selection by the man in the car.

Secondly, it seems that the problems associated with common frequency broadcast operation of many stations may be improved by a move from AM to the double sideband diminished carrier system currently being investigated by this department.

In conclusion, I feel that it is essential for the forces and this department to examine the relationship between the operational needs on the one hand and the feasibility of engineering these on the other.

Mr Taylor joined the Directorate of Telecommunications in 1946 after war-time service in the RAF on signals duties. He served at several regional depots before posting to HQ as a Regional Wireless Engineer in 1968.