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Steven R. Cole
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FORWARD PLANNING: THE IMPORTANCE OF CLARIFYING

OPERATIONAL REQUIREMENTS

By: J L Brock Fire Liaison Officer

This talk is about one particular aspect of forward planning, namely the importance of clarifying operational requirements so that new systems can be developed to meet future police and fire needs.

The Director has frequently said "tell us what you want and we will give it to you" and that he has now got the staff to develop new systems for the future. In other words if the Directorate of Telecommunications is to give birth to a new generation of communications facilities for the police and fire service, the two operational services must get down to detailing exactly what they want new systems and facilities to achieve. In other words they must clarify their operational requirements.

Exactly what do we mean by this? Your natural reaction is probably one of some scepticism and you probably think "well we know what we want; why all the fuss?" Our experience is that if an operational officer is asked to draft user requirements for an operational system or piece of operational equipment his immediate reaction is to reach for a pencil and paper and start listing all the various items he regards as essential and he probably finishes with a pretty formidable list. He then probably goes on and lists other items and refinements which, although perhaps not essential, he might classify as "highly desirable" provided they did not cost the earth or involve other complications.

On the other hand if an operational officer is asked to draft an operational user requirement for a communications facility or system it seems that he rarely knows where to start, probably because communications is a subject which is a bit outside the normal scope of a police or fire officer's duties and responsibilities. To him it is a subject which appears to be one mass of technical complexities and he is probably blinded by technicalities about which he knows little.

We cannot emphasise too strongly that you do not have to possess technical knowledge to produce a clear operational user requirement. It is essential to avoid even thinking about communications technicalities because they only confuse the issue. Try instead to concentrate on what you want a system to achieve and what you want it to do for you. Even so, it is not quite so simple to do this as it sounds and it is not until you get down to it that a picture of considerable detail starts to emerge. It is also important to aim at the various requirements which are essential and to avoid complicating the issue by asking for the moon.

In the case of the police the Communications Committees of the Central Conference of Chief Constables and Association of Chief Police Officers deal with police operational communications requirements and the Joint Committee on Fire Brigade Communications is very active in clarifying operational requirements for fire service communications.

We cannot go into very much detail here but we would like to try to illustrate what is meant by the request "clarify your operational requirements."

Let us consider, as an example, the broad basic operational requirements for fire service communications which, irrespective of the size of commands, are briefly as follows:

- a. Facilities for the receipt of emergency calls from the public and from automatic fire detector systems.

b. Facilities for processing emergency calls very quickly to determine correct first attendances of appliances, personnel, equipment and officers; not perhaps strictly 'communications' but very closely allied to it.

c. Facilities for alerting personnel and the speedy transmission of turnout instructions to them at the various types of station involved (e.g. wholetime, retained, day manned, etc).

d. Facilities for communication

i. between static controls and mobile appliances

and ii. between controls and fire stations.

e. Facilities for communicating between individuals on the fireground and between them and certain other units.

f. Communications for fire service domestic services.

We realise that although similar in many respects this list does not fully represent basic police communications requirements but in an abbreviated form it probably describes the operational requirements for fire service communications fairly accurately in broad terms. We must emphasise the fact that items a. to c. must be served by systems which enable emergency calls to be accepted and processed and appliances despatched very quickly indeed (ideally in less than one minute). These systems should be protected against the effects of technical breakdown since the service must be effectively operational at all times of the day and night. The need for a high degree of protection for communications systems for the emergency services to prevent serious breakdown cannot be over emphasised especially where control is centralised in a comparatively large area. And finally, and this applies to Police and Fire, systems should be fast and simple to operate.

Whilst fire officers may (or may not) agree that this accurately summarises the broad operational requirements for use by the engineers it must be broken down and expanded in as much detail as possible with the resultant need for a number of separate but closely associated systems. We cannot do this here but it involves considering in detail such things as the requirements for main radio schemes, breathing apparatus and fireground communications, officer paging and selective calling facilities, the possible use of computers and digital storage systems etc. Pick out any one of these items and we could spend the rest of the day discussing the details.

For the police the field includes in addition such things as the need for improved personal radio facilities, picture and fingerprint transmission equipment, automatic data transmission and network switching, development of improved speed meters, etc.

With the present tendency for the development of larger operational areas, special consideration needs to be given to the extent to which it is economically viable to extend centralised control and communication systems without detriment to operational efficiency. Research into the design and provision of improved communications systems to meet these requirements must at all stages of development be influenced by two important factors:

a. Present handling and response times must not be increased (especially during peak periods) and

b. The degree of safeguarding required to prevent breakdown increases considerably with the introduction of larger control schemes.

Once an operational requirement has been clarified and agreed by everyone concerned it is then for the Directorate of Telecommunications to either come up with the answer, (the system or systems which will do exactly what is wanted), or to propose a suitable compromise between ideal operational requirements on the one hand, and on the other the limits of technical and economical practicability.

A good example of operational requirements for police and fire services not necessarily being identical, and of the possible need for compromise on the lines mentioned above, is the present situation regarding radio schemes covering large areas. The ideal operational requirement is 100% coverage, with end-to-end talk-through between mobiles anywhere within the operational territory, good clear signals, and a consistently high standard of reliability. (The fire service probably needs better coverage than the police since fire appliances in action are virtually immobilised.) In practice some compromise in the ideal operational requirement could result in improved facilities in the short-term, and the Fire Service Communications Committee is considering with the Directorate certain possibilities along these lines.

Another area in which the ideal operational requirement is clear but compromise is probably needed is that of breathing apparatus communications. Apart from all the obvious points such as size and shape of equipment, types of microphone, loudspeaker etc, the main problem is to overcome the natural limitations imposed by the propagation characteristics of the radio frequencies used; and unless a frequency can be found with which screening effects are negligible some compromise may be necessary.

We are merely pipe dreaming at present if we continue to hope for a very small "James Bond" portable set which, without the aid of a suitably sited control set, will work directly from one set to another in typical fireground circumstances, although enthusiastic salesmen may well try to persuade you to the contrary. The success or failure of any VHF or UHF pocket set scheme depends on the location of a master station - a carefully sited transmitter providing coverage over the local area. This is the reason why for example the police pocketfone schemes are successful. Providing the necessary coverage, or if you like 'range', is one of the problems in meeting the breathing apparatus requirement. Whilst it is easy enough to provide a fixed main station to give permanent coverage in a given area, it is not so easy to provide a portable or mobile system which will provide the desired results in the varied and often highly screened conditions encountered on fires. Fire itself can also be the cause of quite serious screening.

A considerable amount of testing and research is going on within the Directorate of Telecommunications and at the Central Communications establishment at Harrow (where there are some very convenient two-level underground basements.) They have tested with VHF and UHF, including the use of leaky-feeder aerials (a line trailed part way into the building) and very briefly the answer at present seems to be that it is a case of six of one and half a dozen of the other, neither UHF nor VHF being good enough for consistently reliable use with breathing apparatus on the fireground. Investigations are still proceeding. In the meantime it is wise to treat sales talk about the penetrating powers of various manufacturers products with a great deal of suspicion.

These examples have been given to illustrate some of the problems involved in meeting particular requirements, and the fact that mutually agreed compromise solutions may sometimes be necessary. Nevertheless, they should not be allowed to cloud the original issue, namely the importance of clearly stated operational requirements.

We hope that in this short article we have said enough to alert you at least to some of the problems which are involved in clarifying operational requirements. It is not sufficient to say: "in this day and age is it not time that we used radio for this or that?" but rather that we should be giving the technical back-room boys a chance by painting a detailed picture of what we want for without this they cannot make much progress. If they get from us a clearly stated operational requirement they can at least say quite quickly whether new and sophisticated systems exist, whether systems exist which might quite easily be modified, or lastly, whether it is necessary to create a completely new system to meet operational requirements.

It is only by approaching communications planning in this way that we stand a reasonable chance of getting new facilities, be they line or radio, which really meet the operational needs of police or fire emergency services where requirements differ so much from those of the ordinary user.

You do not find systems which really meet such specialised usage requirements by looking around on manufacturers shelves, or by listening too seriously to the enthusiastic but often exaggerated claims of sales representatives. The firemens pocket alerter system which was first mooted in about 1958 is a good example of this. After spending a considerable amount of time, without success, looking for an existing system which might be suitable, a detailed operational requirement followed by a technical specification was written and purpose built equipment produced for operational field trials purposes. The equipment which is now going into operational use is the result and there is every reason to think that it will prove to be highly successful.

There is no doubt that we are on the threshold of extremely interesting new developments in the communications field and I believe at this critical time that the work which is going on in detailing communications requirements for the two primary emergency services is more important than ever it was.

Nowadays it is certainly right to say that almost anything is technically possible, but before it can become practicable it is usually necessary to invest a considerable amount of capital on research and manufacture. In short, new and sophisticated systems are always likely to be expensive especially if the potential demand is confined to a comparatively narrow field such as the police or fire service, and this is a very good reason why detailed operational requirements should be confined in the first instance to facilities which are regarded as absolutely essential. Consider listing 'optional extras' by all means if the additional cost can be justified but it is vitally important from the outset to pinpoint essential requirements in the right priority and thus confine any ultimate requirement to basic essentials.

Mr J L Brock served in the AFS and NFS during and after the last war and was Area Communications Officer No.30 Fire Force. From 1948 to 1952 he was Kent Fire Brigade Communications Officer. In 1952 he became Assistant Inspector of Fire Services, Home Office, with specialist reference of Fire Service Communications and is now Fire Liaison Officer to the Directorate of Telecommunications.