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SOME OPERATIONAL ASPECTS OF STEREO SOUND FOR TELEVISION

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INTRODUCTION

The speaker has been a Sound Supervisor with the BBC in London for a number of years. For the last two-and-a-half years he has had a special responsibility for the operational development of stereo sound within the Television Studio Operations Department, preparatory to the commencement of the BBC's Public Stereo Television Service at the end of August this year. Up to that date, BBC experimental stereo transmissions using the Nicam 728 system had been running for some five years. Over four thousand programmes were transmitted with stereo sound during that period, allowing considerable opportunities throughout the BBC for the evolution of techniques to realise fully the potential of this new medium. In this paper, he explores the background to some aspects of the new stereo environment.

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THE CASE FOR STEREO DIALOGUE

Stereo Sound for Television is not quite the same as Stereo Sound for Anything Else. Admittedly, it has elements in common with other media - there's an obvious comparison to be made with both radio and cinema - but it is the matching of sound to picture in an intimate domestic environment which has always been the particular distinction of television sound.

Adding stereo sound to television pictures increases enormously a director's story-telling capacity. This, once fully realised, implies that there's a whole new medium to be created, and leads to the conclusion that, in order to maximise the extra dimension that stereo can give, all the elements of the sound in any programme should be in stereo if at all possible. Whilst, with the experience of radio and records, most people find it easy to accept that music programmes should be in stereo, the acceptance of stereo for other types of programme has been more difficult to realise. The next step has been to introduce stereo to the music component of other programmes - and indeed a large part of the world has settled for that and pretended they're making stereo programmes. If other elements, such as effects and audience, are turned into stereo, that goes a long way towards giving the audience a new experience - but something's still missing! That something is the most important element in almost any programme - the dialogue.

The general acceptance of stereo amongst television audio practitioners in this country has become universal; whether or not the dialogue should be in stereo has become the only serious schism. Those who argue against usually perceive that stereo dialogue pick-up is so well-nigh impossible that the practical difficulties outweigh any potential artistic advantages, and include a reference to the fact that the cinema industry has opted for mono dialogue (they must know best with all their experience, mustn't they?). There are only negative statements; I have yet to hear anybody produce positive arguments for the continuation of mono dialogue in the stereo domain.

The fact that the cinema currently opts for mono dialogue is irrelevant. The wide viewing angles possible because of a wide screen lead to a perception that the safest way out is for the dialogue to always appear to come from the centre of the screen; the almost universal adoption of matrixing systems which result in dialogue coming from a centre loudspeaker reinforces this view. Arguably it is the creation of apparent reality in the marriage between sound and pictures which sets television aside from other media; the unreality acceptable in, and even demanded by, theatrical exhibition is frequently unconvincing when transposed to the small screen in the living-room.

Mono dialogue cannot match the completion of the picture, the blend of background and foreground, and the feeling of space, movement and location that can be so easily achieved with well-recorded actuality stereo. It has to be admitted

that if one ignores the possibilities of stereo dialogue, a programme can be turned into stereo of sorts in post-production, a lot of the perceived problems go away, and Luddite recordists can breathe a sigh of relief (apart from making stereo wild-tracks, of course). This easy way of making a sort-of-stereo programme can be very attractive, especially if you believe that stereo dialogue is going to cost more.

I have to allow that mono dialogue with stereo effects can work for a large percentage of the time, but only up to a point - and that point is where the lack of space and movement in the foreground (the dialogue) tells lies with respect to the stereo magnificence laid-in afterwards in the background. A certain amount can be done in the dub by panning individual speeches, but any overlap of words will make this impossible to sustain. If one stops thinking of the "dialogue" as merely containing speech, and thinks of it as the "sync." which contains such elements as doors opening and closing, cars arriving, other people making noises in the background and so on, this becomes more obvious. All these things take ages to simulate in the right place with the right perspective and acoustic at the dub; usually they can be picked up when shooting in a finally usable form, with all the time-saving that implies. The stereo dialogue usually takes no longer in dubbing than mono, provided that it's well-recorded and sensibly edited; most of the time in dubbing is still taken up by FX and balance decisions. So, if stereo shooting can be done with no more trouble than mono, then these advantages make mono pick-up obsolete.

From experience, I know that it is totally possible to routinely pick-up and record stereo dialogue with no more expenditure of time (and therefore money) or trouble than before. Of course there'll always be minor exceptions to a statement like this, but I make it quite sincerely. Even if it isn't strictly true the first time one tries stereo pick-up, it becomes more true as one does it more often; the important thing is not to be afraid of tackling it for the first time. I suspect a lot of objectors have a strong fear of the unknown; most of the "philosophical" objections seem to vanish once the achievable results are heard. After all, we are only talking about two audio channels instead of one, and it's very difficult to spoil the derived mono provided that one uses basically sound techniques such as co-incident pairs.

The accent on cost is most important, as there isn't any extra money anywhere for stereo production. Some extra capital outlay is inevitable. However, there are already many items of basic kit which aren't made in mono versions anyway, and some of the initial re-equipment is in the nature of adding things rather than replacing them, so that overall this need not be as enormous as is generally thought - certainly not double! The more important potential extra cost is represented by time, and therefore the accent has constantly to be on making stereo programmes in the same time as equivalent mono ones. Nobody (yet!) expects them to be made in less time, but it's very important to analyse alleged extra costs for stereo, as all too often one finds that basic problems within a programme which would exist in

mono anyway are being blamed on "the stereo". It's all too easy for anti-stereo mythology to be generated in this way.

I've already mentioned that the stereo dialogue should be "well-recorded", and this is the key to keeping costs down throughout the whole audio process. I don't mean that sound men will from now on be insisting on "perfect" stereo and demanding that everything should revolve around the mic. positioning - they recognise the continuing importance of making quality judgements in terms of time and practicality, and of assessing the stereo output with regard to whether it works with the picture and the total medium. In other words, they'll be as realistic as they've always been.

What I mean by the phrase is dialogue/sync. which is capable of being edited smoothly and dubbed easily - and after all, that's no less than what should be the goal in mono; the only extra parameter is the width. It's fairly easy to make judgments about where to place people in the sound stage in multicamera shooting, as by and large the development from shot to shot and situation to situation is there in front of one. When working on a single-camera shoot, the recordist needs to keep the overall shooting geography in mind when doing close-ups and pick-ups, so that, for instance, someone who is on the left in the master shot continues to be slightly left in their close-ups; this ensures that the editor can cut freely, take sound from different shots and use all his normal techniques. At the dub this should result in a consistency of imaging which will need a minimum of adjustment. It also makes for a consistency in the background so that distinct sounds won't wander from side to side on cuts.

This sort of approach helps the overall aim of a smooth output that convinces the listener/viewer that the sound he's hearing is coming from the place he's seeing. To this end the concept of the "sound stage", where imaging which relates to the main shooting angles is maintained even though the camera looks at particular details, is most useful, and results in less disturbance to the viewer than a jerky shot-by-shot approach with continuous image-shifting depending on what the camera is seeing at a particular instant. In real life the eyes swivel about and select different viewpoints whilst the sound image received by the ears stays constant; research indicates that the viewer indeed accepts an apparent dichotomy of sound and vision provided he has been shown what the real situation is and that the sound is consistent. A simple instance of this is found in the coverage of serious music. Close-ups of the conductor and individual instruments are acceptable without changing the stereo imaging, provided that the stereo "picture" relates to what the viewer knows to be the real geography of orchestra and concert hall.

In practice, dubbing mixers who adopt the sound-stage approach also use a certain amount of shot-by-shot as their instincts dictate, and sometimes to help with imaging problems in transitions from one sequence to another. As with all sound-mixing situations, experience gives one a "feel" for the ways in which to achieve a

smooth and seamless result, and handling stereo dialogue is no different; the more one does, the easier the resolution of difficulties becomes. There's always some way out of problems such as reverse-angle picture cuts - the worst that may have to be done is a drift to mono and a return to stereo when it makes sense. If the picture sequence is studied there's always some point at which this can be done elegantly - and if the story calls for it, why not deliberately reverse the imaging on a relevant cut?

The amount of width that can be used is the subject of much debate; one shouldn't jump to conclusions before listening to a wide variety of material, but the general consensus seems to be that a maximum width of one-third either side of the centre for on-screen dialogue is acceptable. If you think that's not very much, it still leaves a lot of room for off-screen dialogue, acoustic and out-of-vision happenings, whilst still allowing the feeling of foreground space and movement to be realised. Also, it hopefully still allows the impact of stereo to register in the averagely narrower listening conditions at home. These judgments must be made by the dubbing mixer in the context of the whole production; the maxim for the recordist has to be "put it down as wide as you dare" - the width can always be reduced later, but increasing it may create problems which make it unusable.

M/S TECHNIQUES: MICROPHONES

The special demands of television shooting and post-production have led to the development of special techniques, often based on a revival of older ideas, particularly the generation and handling of stereo signals in an M/S configuration rather than the more usually encountered A/B form. The use of M/S mics. is one aspect; at a time when no suitable single-casing stereo mics. suitable for mounting in a microphone boom were available, the need arose for a second mic. in the boom to supplement the existing end-fire mono cardioid with as little change to the existing mount as possible. Rather than use an A/B pair in the form of crossed cardioids, therefore, the addition of a coincident side-fire figure-of-eight mic. to make an M/S pair fulfilled the requirement.

Other benefits became apparent. The output of the 'S' mic. which is matrixed equally to both legs of the A/B signal in anti-phase is self-cancelling, so that in derived mono only the output of the 'M' mic. will be heard; thus the integrity of the derived mono can be guaranteed. It is almost axiomatic that in television, sound pick-up one can only rarely get the mic. in the right place, and this obviously won't change for stereo given the parameters of time mentioned earlier. By varying the gain of the 'S' mic. one can get the mics. into as good a position as possible for the mono coverage, and then vary the apparent width of the image to suit the shot. The boom operator finds that he still has a mic. ahead of him that he can point easily; some change in his technique is necessary, as he usually has to aim slightly to one

side of a sound source in order to give it the correct image. It's no good pointing the mic. directly at whoever the camera's looking at on every shot, as this will merely give mono dialogue with moving backgrounds! If the mic. is being "tweaked" to keep speakers "on-mic", the same mono results can be achieved by moving the mic. sideways still pointing in the same direction, which preserves the stereo image in both foreground and background.

More recently, manufacturers have progressively introduced single-casing stereo mics. in the M/S configuration, frequently with a matrix to convert the output to A/B and the ability to vary the gain of the 'S' mic. built in. This type of array overcomes the operational objections of recordists "on the road" who are very concerned about any extra weight or lack of portability in new equipment, as well as making the life of the boom op. a lot easier.

For location work, the rifle mic. in various sizes has become almost universal due to its property of side-rejection of unwanted sounds. Unfortunately, the pick-up pattern when combined with a figure-of-eight can sometimes be too narrow to give totally satisfactory stereo results when a wide acceptance angle is needed. It seems a good opportunity to re-think coverage on location in terms of varying the type of mic. used much more to deal with individual situations. I realise, of course, that more gear has to be carried around, and that no more time will be allowed for experiment than at present; once again, it's take-the-plunge time, and build up experience.

There are several misapprehensions about what constitutes an 'S' mic. It only works if it's coincident with the 'M' mic, and then only a figure-of eight can be used. It just is no good detaching it from the 'M' and using it as a fixed mic. whilst the 'M' mic. is allowed to wander about picking up mono sound as before; the changing phase relationships will preclude any useful stereo information being gathered. Similarly, there's no point in putting up any old mic. (e.g. an omni) and pretending it's the 'S' mic. All this will do is produce an uncomfortable feeling of something out-of-phase on the edges of the stereo stage.

M/S TECHNIQUES: RECORDING & MIXING

Another revived technique much in use is M/S recording. I have to make a very clear distinction between the employment of M/S mics. and M/S recording as they are two totally separate techniques. The output of M/S mics. can be quite easily recorded as A/B and vice versa. There is an inherent bias in favour of A/B as that is the format of the final signal, but when audio post-production is to be employed, M/S recording of original material for use in the intemediate stages may have some advantages. The use of this technique has proliferated; I believe that this could be partly a matter of fashion, and partly a matter of confusion. The occasions on which it is a more preferable standard are fairly limited and specific.

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Firstly, if potential inequalites in a second recording track are anticipated, for reasons of quality or susceptibility to damage, then an A/B recording will suffer in two ways: the derived mono will suffer, and "image wander" between left and right will be apparent. By recording the signal in M/S format, after matrixing the derived mono will be equivalent to the first track, and only much-less-objectionable variations in width will be apparent.

Secondly, the provision of M/S tracks to a Film or VT Editor, especially if he doesn't have totally adequate monitoring, can give him the facility of listening to the 'M' track only and therefore carrying out the procedures to which he is used in a mono edit, whilst ensuring that the 'S' signal is transferred at the same time. This goes back to the sound being "well-recorded", because it is implicit in this system that the recordist has provided tracks that will survive the editing and still be easily usable by the dubbing mixer..This arrangement can be a very attractive proposition for an editor inexperienced in stereo, but many editors who've worked in stereo for a long time have learned to make the judgements necessary and prefer A/B anyway, as their areas are designed for that regime. The determination of format should therefore be a matter for discussion between all parties concerned.

In dubbing, the M/S configuration can be very handy, as variation of the 'S' provides instant width control. However, an A/B signal can easily be converted to M/S on the mixing desk to give the same facility, so that per se there is insufficient reason for M/S recording. The same applies to other spurious reasons, such as the desire of some recordists to monitor only the 'M' and tuck the 'S' away in the hopes that the dubbing mixer might be able to make some use of it later. Needless to say, he very rarely can.

In the simplest situation with one M/S mic. and a tape machine M/S recording may be reasonable as a simple and very portable way out - but at the very least the signal must be monitored in A/B stereo by using a headphone monitoring matrix to ensure that the results are stereo-viable at the time of recording. With experience, it's quite possible to make sufficiently accurate stereo judgements on headphones.

For any other more complex operations, through a mixing desk, a mixture of M/S and A/B mics. can be used provided that matrixing is used to provide a consistent output. In order to be able to add mono mics. and pan them into place, which is frequently necessary, the mixing operation must be carried out in A/B. There is no way that a mono mic. can be panned between M & S to produce the desired imaging when matrixed to A & B, as it has to be for transmission. If it has been decided to record the output as an M/S signal, then the whole output of the desk must be matrixed into this format - but the monitoring must still be kept in A/B.

It is folly to be tempted to add or subtract level from the 'S' signal on the grounds that it may be under- or over-modulated relative to the 'M'. If the former, then the width is probably insufficient; if the latter, it is probable that non-coincident

techniques are being used and phase-cancelled signals produced. If mixing is done in A/B, monitored properly and then converted, there's no way that the 'S' can be at the wrong level.

CONCLUSION

The percived difficulties of realising Stereo Sound for Television can all be overcome with understanding of the objectives, a little will on the part of sound operators and a certain amount of initial patience on the part of producers. A lot of the problems have been resolved and some of the grammar of the new medium is evolving. The battle that has to be won is the general acceptance of stereo as part of the everyday television medium, and by that I do mean "complete" stereo. I am sure that the eventual results will justify the effort, and that Television Sound as a craft will receive the greater recognition that is its due.

I leave with you the thought that just as mono sound apparently gives less problems, so once did monochrome - and who wants to go back to the days before colour?