Reflections upon a near-future T-DAB conference

— or making "war on this bloody tyrant time"

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This article gives a brief outline of the topics to be discussed at the forthcoming T-DAB planning meeting, which will be held in Maastricht during June 2002.

Introduction

It is sometimes said that there is a time and place for everything. This statement is so obviously true that, like many equally obvious statements, it is usually intended to convey the opposite meaning. Certainly, in the opinion of the authors, this is definitely not the time, nor probably the place, for an article on the forthcoming T-DAB planning meeting which will take place during June 2002 in Maastricht, Holland. However, an edition of **EBU Technical Review** that is devoted to planning matters, and to planning conferences in particular, would not seem complete without something being said about this event, which is almost upon us. (It also has to be admitted that the Director of the EBU Technical Department did exert some pressure on us to write this article!)

Why is it thought to be an inappropriate time for this article? To answer that question it is necessary to consider the life cycle of a typical broadcasting planning conference. (In fact, this life cycle is probably typical of most telecommunications conferences and, possibly, conferences in general.) Conferences do not just happen, they are prepared over a period of time and everyone involved knows what the time frame is and what preparations have to be made and when. Equally, everyone involved is convinced from an early point in those preparations that the future conference – may not provide the answer to all the fundamental questions of life – but at least will solve some of the immediate problems and, in addition, provide a solution which will have a positive effect for many years. Possibly because of this euphoria, there is a tendency to delay giving attention to some of the more difficult details at an early stage.

Another well-known phrase comes into its own in this context: "*The devil is in the detail*". About six months to one year before the date of the conference, the devil raises his head and starts to ask questions about those difficult details. It is not long before some degree of panic becomes evident and that panic then gets in the way of rational progress. It does not really matter what the panic is about, it is quite enough that it is present, which it always is, although the central issue is that there is insufficient time [1] to find the answers which are needed, or to complete the preparations or ... This element of panic usually lasts at least until the conference starts, except when things are so hopeless that resignation sets in earlier. Thus an article which is written in the last six months before the start of the Maastricht conference is bound to be influenced by some negative thoughts.

It may be worthwhile to continue with the typical life cycle of a conference. When a conference actually starts, there is a feeling of relaxation; after all, everyone (or almost everyone) has arrived and most of the preparations are complete. The relaxation is accompanied by relatively slow progress and this continues until one

1. It is the theme of insufficient time which prompted the slight misquote from William Shakespeare that is used in the third line of the title to this article.

of the delegates reminds everyone that "*Half of the time for the conference has already been used and no progress has been made*". This is often not really true , but it is said anyway. In any case, it is a trigger for more panic, followed by night sessions for all the delegates (some of them, of course, have already experienced these night sessions in the period when no progress was apparently being made or recognized). At the appointed time and/or date, the conference finishes and is declared to have been a great success. Everyone goes home happy, feeling that real progress has been made. Life continues for a time until people start to ask "*Did we **really** agree **that**?*" Then they start to make preparations for the next conference. Of course, there are exceptions to that last comment and, happily, broadcasting conferences are usually not followed by any repeat or replacement conference, except after a very long time period. Of course, that could be for several reasons!

Putting the conference in context

After the DAB system was developed and it was considered for deployment, it was obvious that some part of the frequency spectrum would be needed and that, because of its wide bandwidth compared with other systems then used for sound radio broadcasting, this would need to be spectrum not then in use for sound radio purposes. While spectrum in the band 1452 – 1492 MHz had been obtained at the 1992 WARC for DAB usage, there was also a perceived need for additional spectrum at lower frequencies in order to allow for terrestrial DAB services which were intended to cover large areas with a common set of programmes. It was finally agreed that this spectrum could be obtained by use of part of the spectrum then in use for terrestrial television broadcasting. The end result of this search process was the T-DAB planning meeting at Wiesbaden in 1995 (WI95) at which allotments were obtained for two coverages for each country in the area covered by the CEPT (this is a slight simplification, but one which need not concern us here).

Subsequently, the need for additional T-DAB services intended to cover smaller areas was identified and, from about 1997, the CEPT started to consider the general requirements and the possibilities. By the end of 1998, a CEPT questionnaire had established that there was a clear need for what was called a set of "third priority" requirements – the two coverages obtained at Wiesbaden having been called priorities "one" and "two". Technical estimates of the amount of spectrum needed for a set of additional requirements, similar to those for the second priority allotments, indicated that about seven "blocks" at 1.5 GHz would be required; these blocks would be additional to the nine 1.5 GHz blocks used at Wiesbaden. Because it was believed that all the technical problems associated with a T-DAB planning meeting were well understood, it was considered possible to hold the necessary planning meeting relatively soon and the proposal was for the second half of 1999. However, by mid 1999 this had been moved for a variety of reasons – only some of which were to do with the reappearance of S-DAB – to mid 2000.

Satellite DAB

Satellite DAB (S-DAB) had been the original proposal for the use of the 1.5 GHz band (together with complementary terrestrial DAB) but it had never received enough support for a satellite to get off the ground, or even to be built. The basic problem seen by most administrations was that S-DAB could not offer a sufficiently large number of programmes to meet the current demand, a demand which in any case increases with time. When the original S-DAB proposals were made, there were relatively few radio programme chains in most countries. Subsequently, there was an explosion in the number of radio stations and most of the newer stations were intended to cover rather restricted areas – local radio in its various forms. S-DAB did not have access to sufficient spectrum to meet these demands on its own, and it could be argued that to serve small areas by

Abbreviations

CEPT	European Conference of Postal and Telecommunications Administrations
DAB	Digital Audio Broadcasting (Eureka-147)
S-DAB	Satellite - Digital Audio Broadcasting
T-DAB	Terrestrial - Digital Audio Broadcasting
ITU	International Telecommunication Union
WARC	(ITU) World Administrative Radio Conference

means of satellite transmissions is an inherently inefficient use of the spectrum. As a result, if DAB services were to develop and to meet the perceived demands of the audience, T-DAB services were given access to the 1.5 GHz band.

It was quite clear to any potential S-DAB operator that new T-DAB services would eat into the spectrum nominally available for satellite-based services and, as a result, a very large debate was opened concerning most aspects of the DAB system and the planning approaches used until then [2]. It can be argued that this debate did not succeed in changing any of the basic decisions which had been made in the previous years [3]. However, it did have the effect of introducing a series of delays into the T-DAB planning process, and the proposed date for the planning meeting was deferred on a number of occasions, finally finishing as June 2002. It is interesting to remember that the original request from the potential S-DAB operators was for a delay of two years in order for them to put together the necessary commercial packages and develop a firm technical proposal. In the event, a delay of three years has occurred in the date of the planning meeting and it remains to be seen if there will be any resultant delays in the introduction of the T-DAB services which will be agreed at Maastricht. Perhaps it is possible to make “war upon the bloody tyrant time”.

Current time frame

In the second half of 2001, the responses to a CEPT questionnaire enabled a choice to be made of the set of seven additional blocks to be used for the planning meeting in Maastricht. This choice was those seven blocks immediately above the nine blocks used at Wiesbaden, with the uppermost seven blocks currently reserved for S-DAB services. In addition, it was possible to perform an initial analysis of the T-DAB and Other Service [4] requirements submitted by administrations. These analyses only concerned the conformity of the requirements with the specifications which had previously been agreed. It is to be expected, in the early stages of a data-collection process, that there will be a number of difficulties experienced and clarifications needed, and nobody was disappointed in this respect! However, it served as a preliminary to a real data-collection exercise which was scheduled to be completed by the beginning of December 2001 and, indeed, was largely completed by the time that the Christmas holiday period started.

A further analysis for conformity with the specifications and relevant data corrections were needed before a technical examination could take place in time for a meeting and discussion of the results in mid January 2002. This examination involved an analysis of the potential interactions:

- between the approximately 2000 T-DAB requirements;
- between them and the approximately 500 Wiesbaden requirements which were allotted blocks at 1.5 GHz;
- and also between them and the Other Service requirements.

The number of these non S-DAB Other Service requirements to be taken into account is not entirely clear, as some of them are in the uppermost six (out of 23) blocks where they will not apparently have any interaction with T-DAB requirements in any of the lower 16 blocks. However, there are about 600 Other Service requirements at present. In addition, there are S-DAB requirements submitted by France and Luxembourg for the upper seven blocks, and the adjacent-block protection requirements for these are under discussion as this article is being prepared.

2. The real aim of the S-DAB potential operators in this debate was to try to restrict T-DAB to the nine blocks used at Wiesbaden.
3. This text is another example of how the time at which an article is written can have a major impact on its content. The debate about the T-DAB system and its planning occupied many people for a relatively large amount of time and generated some rather emotional discussions. If this article had been written then, it would have reflected that situation. It is now somewhat easier to place it in context.
4. Other Service requirements are submitted in order that they may be taken into account in the planning process. No consideration is given to any possible interactions between the Other Service requirements and little account is taken of their technical characteristics, other than their protection requirements against potential interference from T-DAB services.

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Terry O'Leary received a doctorate in Physics at the University of California. In 1975, he joined the *Institut für Rundfunktechnik* (IRT Munich) where he conducted research on a range of topics including propagation, antennas, and terrestrial network and satellite planning.

In 1979, Dr O'Leary joined the EBU Technical Department where he became involved in many projects within the framework of EBU Working Party R. From 1984 to 1990, the IFRB benefitted from his specialist knowledge of HF and television network planning. He returned to the EBU in 1990 and was involved in T-DAB planning, WARC'77 BSS replanning and other projects.

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The results of the analysis process were then used in the synthesis process, these two processes being performed by the authors of this article. It has to be stressed that the results obtained are only preliminary as there were undoubtedly omissions and errors in the input data and ambiguities in some of the data used in part of the analyses. However, the initial results were rather promising with all but about 150 of the T-DAB requirements being found a block in the synthesis process. Of course, with such good news being given as an initial result, there is always bad news to follow and the latter is that, after a number of corrections had been made, the number of requirements which could not be found a block rose to about 250. It is to be expected that this number will experience a further increase when the aeronautical telemetry service used in Russia, and some of its neighbouring countries, is taken into account.

To place these results in context, at the start of the Wiesbaden planning meeting, less than half of the T-DAB requirements could be found a block.

It is interesting to consider why there should be such a large difference. It is primarily due to the relative absence of Other Service requirements submitted for consideration. At Wiesbaden there were about 750 T-DAB requirements and more than 40,000 Other Service requirements. Indeed, the latter were really the dominant feature at Wiesbaden, both in terms of the technical difficulties which they caused and the political problems which resulted. There is also one other ameliorating feature and that is the presence of reference networks [5] which are much better suited to small-area coverage. These have the big advantage that they reduce the distances which need to separate co-block allotments if mutual interference is to be avoided. There seems to be little doubt that the current results would be much worse if the Wiesbaden reference network for 1.5 GHz were used for all of the Maastricht T-DAB requirements. Even this must be placed in context. The Wiesbaden requirements were intended to cover larger areas than most of the Maastricht requirements, and different reference networks are appropriate for different circumstances.

What next?

Between the date at which this article is being written and June 2002, there will be further consideration of the T-DAB requirements and the protection needs of Other Services. There will also probably be informal negotia-

5. A reference network is a theoretical group of transmitters which is used as part of the allotment planning process to represent the outgoing interference which would be caused by a network of T-DAB transmitters intended to provide a service in a given area. When the allotment is later implemented as a set of real transmitters, the outgoing interference from these must be restricted to no more than the levels generated by the theoretical reference network.

tions between some administrations – intended to increase the number of T-DAB requirements which can be found a frequency, either by the acceptance of some mutual interference or by relaxing the protection requirements of some of the Other Services. There will also be further analyses and syntheses as the input data change. Even though the date for the final submission of data has been set for 1 March 2002, changes intended to improve the final results will always be accepted. Indeed, if the experience gained at Wiesbaden is to be re-used, administrative agreements to improve the results will be a vital part of the overall planning process.

The planning meeting itself will take place from 10 – 18 June and it is now certain that the year will be 2002, even though the year has been one of the least certain items for a long time. It must be stressed that June is not far away and, in reality, there is relatively little time left in which to complete the preparations, including the computer programmes, and to hold discussions and reach the agreements that are so necessary if there is to be a mood of confidence at the start of the planning meeting, which will only last one week.

This is definitely not the time nor the place to go into details about the technical criteria to be used during the planning meeting, as there is still time for some of them to change. It is also neither the time nor the place to speculate about the outcome, although there are grounds for cautious optimism, because conferences have a nasty habit of springing surprises on the participants and there is still enough time for unusual requirements to create difficulties (in fact, at Wiesbaden, that happened halfway through the planning meeting and created major problems). When the planning meeting is over and there has been enough time for reflection on the results –and when there is enough time to put pen to paper – it should be possible to produce a further article on the results achieved at the Maastricht T-DAB meeting.

In the end, much of it is about time. It is always the wrong time ... there is not enough of it ... and it is certainly a bloody tyrant!