INNOVATIONS

A SERIES OF ARTICLES WHICH EXPLORES SOME OF THE COMPLEXITIES OF EMERGING TECHNOLOGIES

DIGITAL TERRESTRIAL TELEVISION BROADCASTING—STATUS OF AUSTRALIAN STUDIES

PRESENTATION TO THE FACTS ANNUAL ENGINEERING CONFERENCE SYDNEY 4 JULY 1994 BY COLIN J KNOWLES CHAIRMAN, ABA DTTB SPECIALIST GROUP

Everyday we read or hear some mention of future audio and video information, entertainment services and the 'information superhighway'. Digital Terrestrial Television Broadcasting (DTTB) has sometimes been called the 'on ramp' to the information superhighway.

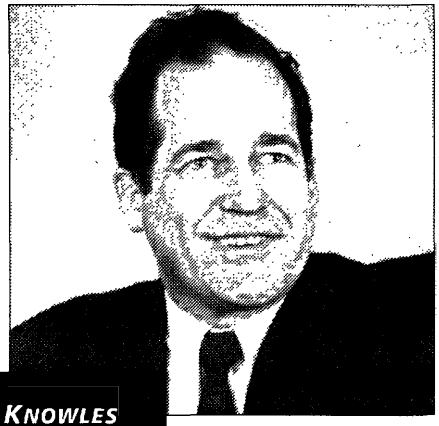
Both cable and satellite transmission of television pictures are rapidly moving towards full digital transmission. Terrestrial broadcast transmission presents a greater technological challenge but will move to digital transmission in most developed countries by the turn of the century. New 'digital' receivers will be necessary to fully exploit the features of this new transmission technology and allow the broadcasting system to meet twenty first century needs.

THE ABA's DTTB SPECIALIST GROUP

The ABA recognised the need for a national approach to DTTB with the establishment in February 1992 of a joint ABA, government and industry group to be the focus of Australian studies into DTTB. The group would also act as a specialist advisory group to the ABA.

The ABA considered the best way to approach this topic was to harness the strengths of all of the groups that had been working on various aspects of DTTB in Australia. It noted that the focus of most groups was on technological aspects and that a wider consideration of public policy factors seemed essential. It did not seek to take over the work of these groups but rather to coordinate their work and address gaps in their activities.

The ABA also decided the DTTB Specialist Group should adopt the same principles of wide public consultation and disclosure as apply to other aspects of broadcasting planning under the Broadcasting Services Act. In this way all voices have equal opportunity to be heard, and to comment on proposals, prior to the ABA taking decisions or providing formal advice to the Minister.



COLIN KNOWLES

The DTTB Specialist Group includes the Federation of Australian Commercial Television Stations (FACTS), represented at network and regional level, the Department [of Communications and the Arts]'s Broadcasting Policy Division and Communications Laboratory, the ABC, the SBS, local manufacturing interests, the ABA and participation by correspondence from some production interests.

Involvement in the working parties of the group is open to any person prepared to make a contribution. This two tier structure has allowed wide participation in the work without creating an unwieldy and unmanageable group. Not including people who have made written submissions, more than 40 experts have contributed so far. Any change to the broadcasting system will affect different participants in different ways. Total agreement may not be possible and this is recognised by the ABA.

The DTTB Specialist Group is not a decision making body. It is an advisory group which will present to the ABA the diversity of views and, as far as possible, will try to achieve unified positions on the various aspects of the topic.

The DTTB Specialist Group has divided its work into three major topic areas:

System Objectives (convened by Mr Richard Barton of FACTS) looks at what we want the DTTB system to provide;

Transmission Options (convened by Mr Keith Malcolm of the Department of Communications and the Arts, Communications Laboratory) looks at the technical alternatives and international developments and provides technical advice and research to the other groups; and

Spectrum Planning (convened by Mr Peter Gough of WIN TV) studies how DTTB could be integrated into the broadcasting spectrum while retaining the existing PAL services.

STRATEGY AND INITIAL OBJECTIVES OF DTTB SPECIALIST GROUP

At the time the DTTB Specialist Group was formed, there was limited information available about the candidate systems. We therefore concentrated our efforts on the objectives of a DTTB system for Australia and examining current spectrum to determine the possibilities for implementing the candidate systems in Australia. At the same time, we continued to monitor international developments and to contribute to the work of the International Telecommunications Union, Radiocommu-

nications Task Group 11/3, established to examine DTTB.

Our objective has been, and remains, the promotion of a single worldwide standard for DTTB, but we recognise that, for a number of reasons, this will not be fully achieved. Nevertheless, progress within TG11/3 and the strong interest on both sides of the Atlantic to achieve common approaches where possible, have seen more convergence.

The almost universal adoption of MPEG-2 picture coding is perhaps the most significant single step towards a digital television system that might be able to address the wider needs of the multiple delivery systems for television in the twenty first century.

Consultation

As a first step towards wide public input to the work, the ABA published a paper entitled *Digital Terrestrial Television Broadcasting in Australia—Issues and Options* and invited public comment.

This paper provided an outline of possible approaches to DTTB and the potential improvements to television DTTB could deliver. Key questions raised in this paper were:

Should the future emphasis be on HDTV or multi-program television?

How should the eventual termination of PAL services be planned?

Should DTTB use VHF and UHF or UHF only?

Should Australia continue to use 7 MHz channel spacing or adopt either 6 or 8 MHz spacing to align with USA or Europe?

Would USA or European system standards be more appropriate?

What is the relevance of pay TV standards to DTTB?

Should the present arrangements permitting local segmentation of delivery within television station markets be preserved in frequency planning for DTTB?

First report - a preview

The first ABA report on DTTB is expected to be published in September 1994. Although substantial work has been done by the systems objectives working group, it remains for the ABA to develop the material further and to provide a broader based policy framework for it so that it will serve the purpose of stimulating wider debate.

Tentative conclusions on the Issues and Options questions

The preliminary proposals coming from the initial work of the DTTB Specialist Group and public consultation will be considered by the ABA in the development of its report. The results of both the public consultation and initial work of the working parties are summarised below:

(Note: these are views of the public and the specialist groups. They have not yet been considered by the ABA).

Should the future emphasis be on HDTV or multi-program television?

The substantial weight of opinion expressed in the public comments and within the DTTB Specialist Group is that DTTB services introduced to Australia will need to have the flexibility to meet market demand. Premature restriction to specific quality or service targets may stifle the market driven development of the service. Broadcasters will need to experiment and react to their audiences in a dynamic way to encourage the purchase of new receivers.

How should the eventual termination of PAL services be planned?

The termination of existing PAL transmissions will depend largely on when DTTB services are introduced in Australia, the level of acceptance of DTTB services by the consumer and the penetration of new DTTB television receivers. Other factors, such as the cost to the broadcaster and consumer, quality, quantity and variety of entertainment services will be significant.

No actual time period or date should be fixed for the termination of existing PAL services in Australia.

The termination date for PAL should be subject to regular review and the decision made after consultation. In the USA, broadcasters will be allocated an appropriate DTTB channel and will be able to operate this channel in parallel with their existing channels. The DTTB Specialist Group has formed the view that a similar arrangement would be needed in Australia to enable the most efficient full conversion to DTTB with the least impact on viewers.

Should DTTB use VHF and UHF or UHF only?

The existing infrastructure suggests there would be considerable advantages in implementing DTTB in a way that was compatible with the existing channel arrangements. That is, maintenance of the same bands as at present so that there will be least impact on transmission and reception antenna requirements. Neither Band I nor Band II are considered suitable for DTTB application and, in some instances, a mix of VHF Band III and UHF television bands could be required to accommodate DTTB. Generally, preference has been expressed by television licensees to retain their positions on existing bands by using an adjacent channel. There are separate arguments that suggest it might be efficient to use UHF in regional areas. Other options, such as mixed VHF and UHF, would also be possible. Further consideration needs to be given to this issue once additional planning information becomes available.

Should Australia continue to use 7 MHz channel spacing or adopt either 6 or 8 MHz spacing to align with USA or Europe?

There is some concern that, if it became necessary to develop a 7 MHz system specially for Australia, it could result in unduly expensive receivers. There are other views suggesting a 7 MHz system could be implemented with minimal penalty. It may even be possible to implement an 8 MHz system within the existing 7 MHz channel spacing model, but this may prove very difficult. A 6 MHz system could easily be accommodated within the present 7 MHz spacing and the additional 1 MHz might perhaps be used for additional data capacity. No final views can be reached on this question until the final transmission proposals are known.

Would USA or European system standards be more appropriate?

It is premature to make a choice of either system at present, particularly as there are signs of increasing convergence between the European and North

Continued on p.18

Continued from p.17

American systems. Further studies are necessary to define the specific characteristics of a system suitable for the Australian broadcasting environment.

What is the relevance of pay TV standards to DTTB?

There is no particular reason why the choice of DTTB standard need be related to the standard adopted for satellite pay TV or other pay TV services that might be introduced in the near term. However, there appear to be longer term advantages for consumers if all services converge to a common standard or to compatible standards.

Should the present arrangements permitting local segmentation of delivery within television station markets be preserved in frequency planning for DTTB?

There is a strong body of opinion that the introduction of DTTB should preserve the flexibility contained in the present PAL system, which allows local input at regional and local transmitters for the injection of local news, information, other program material and advertisements. For this reason, the DTTB Specialist Group does not consider the universal adoption of single frequency network concepts to be appropriate. However, single frequency network principles might be useful for translators that provide in-fill within the primary coverage area of such transmitters. The implementation of wide coverage single frequency networks would also seem to require substantial re-arrangement of existing channel allocations, a factor the DTTB Specialist Group did not consider to be desirable for reasons of cost and public impact.

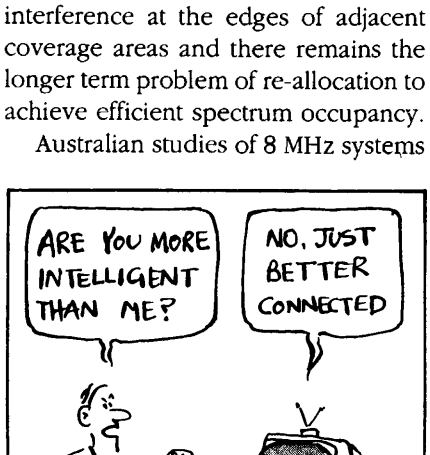
Transmission options

The Transmission Options Working Group has examined the implications of both USA and European approaches to the Australia environment. It has conducted laboratory studies to provide planning parameters to the spectrum planning group covering the various channel spacing and system options. The emission characteristics of the USA and European systems are different—the USA is proceeding with single carrier systems, while the European approach has concentrated on Coded Orthogonal Frequency Division Multiplex (COFDM), a multi-carrier approach similar to that used for the European EU147 DAB system. This results in different protection ratios for each, in addition to different channel spacing. Initial developments in digital terrestrial systems were based on 6 MHz channels (USA) or 8 MHz channels (Europe).

With our 7 MHz channelling plan at VHF and UHF, Australia is faced with the issue of how best to fit the proposed systems into the existing channel plan. The accommodation of a 6 MHz signal is, in a sense, a trivial issue. Clearly, a 6 MHz signal could be easily accommodated but, while this might facilitate the transitional period (the extra 1 MHz perhaps helping to minimise mutual interference between digital services and PAL services) there is, however, a longer term issue of spectrum efficiency which would lead to a need to adjust the assignments to consolidate the unused 1MHz blocks into useable channel blocks. This could be a difficult process.

Accommodation of an 8 MHz signal is more problematic. At UHF, the existing channel plan provides 14 MHz gaps between channels in use in any given location so an 8 MHz signal could be dropped into the gap, but that is a very inefficient usage of spectrum and may not provide sufficient channels to provide digital outlets for existing services. Care would be needed to avoid any inadvertent problems of co-channel interference at the edges of adjacent coverage areas and there remains the longer term problem of re-allocation to achieve efficient spectrum occupancy.

Australian studies of 8 MHz systems have, therefore, focused on the options available to efficiently accommodate COFDM signals with a nominal 8 MHz bandwidth into the Australian 7 MHz channel plan.



Spectrum planning

Working with the best information available from overseas and the results of the Transmission Options Working Group's studies, the Spectrum Planning Working Group has examined a number of implementation scenarios and has concluded it is possible to implement a DTTB service in Australia using channels within the broadcasting spectrum currently unavailable for PAL use.

It seems practical to provide a DTTB channel for each existing and planned PAL service. There are some constraints on full realisation of this objective, but these may be resolved once final details of the systems and the results of field testing are obtained. The studies to date have assumed a nominal 7 MHz channel.

Planning assumptions

Spectrum planning studies have been based on a number of assumptions. There is no doubt that planning DTTB to operate in the same bands as existing PAL services is a difficult task. At this stage, no Government decisions have been taken to accommodate DTTB services nor, if these services are to be allowed, how many channels should be provided. However, for the purposes of planning studies, an initial goal of attempting to provide six DTTB channels nation-wide in addition to existing (or proposed) PAL services is considered reasonable. In some regions (e.g. Central Coast, NSW and the Gold Coast), there could conceivably be demands for eight or more DTTB services in addition to existing PAL services.

To minimise viewer inconvenience and avoid a possible slow initial uptake, we think that DTTB services should operate in the same bands and with the same polarisation as existing PAL services. Similarly, to simplify antenna pointing and avoid larger than desired disparities in received field strengths between PAL and DTTB services (which could result in interference), DTTB transmitters should be co-sited with existing

PAL transmitters. As well as reducing the number of channels available for DTTB, the existing PAL television system with its base of domestic receivers and receiving antenna installations, constrains the planning of DTTB services.

DTTB receiver performance may also impose some planning constraints, although it is expected that DTTB receivers will be able to tolerate higher levels of co-channel and adjacent channel interference than current PAL receivers. In particular, better adjacent channel protection ratios may be an essential feature of DTTB spectrum planning. Unless it is possible to use channels that are adjacent to existing PAL services in the same coverage area, it will be difficult to find enough channels for DTTB services, particularly if Band III DTTB is to be provided in metropolitan areas.

Another important planning issue will be the field strength levels that define the edge of the coverage area of a DTTB service. Selection of an appropriate value requires assumptions to be made about: receiving system performance (receiver, antenna system, loss etc.); channel data rate (this determines whether standard, enhanced or high definition pictures can be provided, alternatively it determines the number of standard definition channels that can be accommodated in the channel); percentage of locations within the nominal coverage area that receive the required field strength; and percentage of time for which the required field strength is received.

From the research so far conducted by the Spectrum Planning Working Party, three different service quality targets have been identified that could be used as the basis for further planning studies. Service planning for broadcasting is based on statistical methods derived from a very large number of field measurements taken over many years in many parts of the world. These techniques are necessary because the actual signal level varies from minute to minute on local terrain and varies seasonally.

For UHF Band IV DTTB, the planning options are: a standard definition coverage encompassed by a contour which provides 90 per cent of locations with a field strength of greater than 37 dBμV/m (alternatively this contour could be considered as providing greater than 49 dBμV/m to 50 per cent of locations within the contour); an enhanced definition coverage encompassed by a contour which provides 90 per cent of locations with a field strength of greater than 43 dBμV/m (alternatively this contour could be considered as providing greater than 55 dBμV/m to 50 per cent of locations within the contour).

As an alternative to providing a single enhanced definition service it may be technically possible to provide two standard definition DTTB services using the same channel bit rate capacity); and a high definition coverage encompassed by a contour which provides 90 per cent of locations with a field strength of greater than 49 dBμV/m (alternatively this contour could be considered as providing greater than 61 dBμV/m to 50 per cent of locations within the contour). As an alternative to providing a single high definition service it may be technically possible to provide four standard definition DTTB services using the same channel bit rate capacity).

The consequence of these considerations is that, if the DTTB service is to provide a high definition service to 90 per cent of locations within its nominal coverage area, it will need to operate at a similar power levels as current PAL services planned on 50 per cent of locations 50 per cent of the time. Alternatively, reduced power levels can be achieved if it is accepted that, at least in the interim phase when PAL and DTTB services have to co-exist, the DTTB service would provide enhanced or standard definition rather than high definition services. Another approach would be to provide a high definition service but to accept that, in the interim phase, a reduced standard of coverage could be accepted at the fringes of the coverage area.

Transmission facilities

Many of Australia's transmitting sites were recently re-engineered to facilitate the additional requirements of the equalisation program. This work was done at great cost and is unlikely to be economically redone for DTTB, particularly in areas of modest population. The newness of the equipment, transmitters, channel combiners and other indoor plant, creates problems introducing DTTB to these sites. In addition, towers are already heavily loaded, as they typically support a Band II FM radio antenna, a channel specific Band III antenna as well as a Band IV or V array.

Environmental considerations make it very difficult to consider new sites or even additional towers at existing sites. The use of adjacent or near adjacent channels for DTTB on the same polarisation as the PAL service makes it possible to consider deploying some of the existing plant to the new service. This also allows fewer disruptions for viewers.

In planning additional allocations for DTTB, consideration has been given to the possibility of changing some of the existing PAL channels. This is not considered generally feasible because of: the capital costs involved; the difficulty experienced by viewers in retuning television receivers; and the effect on commercial balance and competition if only some of the transmitters at a given location change frequency.

Receiving antennas

Most existing outdoor television antennas should be adequate for DTTB, but only if the services to be delivered are in the same band and the domestic receiving antenna installation is in a satisfactory condition. This may not be true in long-established markets where those antennas may be quite old.

Timing

The appropriate starting time for DTTB has been given some consideration.

Some contributors have suggested the 2000 Olympics as a target date, noting that television in Australia commenced the same year as the 1956 Olympics in Melbourne. It is suggested that the Olympics could provide a valuable incentive for early marketing of the DTTB advantages. Others are more cautious, noting that considerable work is necessary, including full assessment of the financial implications.

At this stage, there is no DTTB sys-

Continued on p.20

Continued from p.19

tem in operation anywhere in the world. Decisions about acquisition of equipment for 2000 would need to be made as early as 1996. This may be too early for commercial plant to be available. We think a sensible decision about when it may be feasible to commence DTTB cannot be made at this time, but the topic will be kept under constant review.

Convergence of technology opportunities

Broadcasters will need to consider new opportunities such as multi-program services, wide-screen, HDTV, multimedia and interactivity when developing their approach to future digital television systems.

In the early stages of DTTB, 'set top' converters may be required to enable consumers to view DTTB services on existing PAL receivers. The availability of dual PAL/DTTB television receivers to consumers wishing to gain early access to new DTTB services will be essential to ensure that those who convert to DTTB early in the transition period are not denied access to PAL programming which will continue throughout the transition period.

Receiver manufacturers must also be encouraged to design and manufacture new generation, wide screened, fully-integrated and intelligent receivers, which can be operated by a single user-friendly remote control unit. These receivers should be able to receive and automatically process all available services including existing PAL, pay TV, multi-program services, multimedia and new DTTB services without the need for separate 'set top' boxes and remote controls.

Ideally, the intelligent receiver would be of a modular design, but it must also be affordable if rapid acceptance of DTTB and associated services is to be achieved.

Compatibility with computer display technology

From a broadcaster's and consumer's perspective it might be an advantage for new generation television receivers to offer display compatibility with computer generated graphics and full motion video and become a true wide-screen video interactive home entertainment display centre.

Costs of introduction

Non-metropolitan broadcasters have expressed concern about the potential difficulty in financing a change to DTTB at this time. Transmission costs represent a large proportion of their total costs because of the large number of transmitters and translators necessary to serve their sparser audiences. For many, the costs of equalisation are still a major burden. Similar concerns have been expressed about the high studio re-equipping costs which will be born by the program originators.

Simulcasting or new programming?

In the USA, the Federal Communications Commission (FCC) has made a preliminary decision to require simulcasting. Initially, a 50 per cent simulcasting requirement will be imposed seven years after the application/construction period ends and a 100 per cent simulcasting requirement two years later (i.e. at nine years).

Initial flexibility with the simulcast requirement is allowed to provide, 'sufficient time and flexibility to establish, as a technical matter, a distinctive (Advanced Television) format in the marketplace'. This could be done, for example, by using programs produced in film and directly converted to ATV, or programs originally produced on ATV. The FCC stresses, however, that the broadcaster should not, 'develop a second programming service' in light of the FCC's intention of, 'reclaiming the reversion channel as soon as possible'.

At the nine year mark, 100 per cent simulcasting is required to 'protect consumer investment in NTSC equipment, while at the same time promoting ATV implementation'.

One of the key questions in relation to a simulcast model centres on whether there would be sufficient incentive for consumers to switch over to the digital service if there are no discernible differences in the service provided, except for some technical improvements to signal quality and reception. Although the cost of new equipment is likely to play a role in the rate at which digital technology is adopted by consumers, without other incentives to switch over, the transition period might become unnecessarily protracted. In recognition of this fact, some have proposed that new programming on the digital channel is a valuable option for providing incentive for consumers to switch to digital.

In Canada, for example, it has been proposed that broadcasters have the option of providing a digital service based upon different programming. In the UK, the ITC has also highlighted that it, 'would probably be necessary to allow some distinction in the two program services, with more attractive programming being introduced on the digital service'. A combination of the two approaches may provide the greatest benefit for the consumer in Australia.

Beyond the first report

Publication of the first report on DTTB will represent a further step towards DTTB decisions for Australia. Its primary purpose is to provide a current, common foundation for further development of the technical, policy and legislative framework. We hope that it will stimulate wide debate within the industry and in the community and, to that end, we are attempting to draft the report in language that can be understood by key industry and government decision makers. In other words, do not expect to see a learned technical discourse but, rather, a plain English discussion of the issues.

The ABA intends to support the release of the report with a targeted media campaign and perhaps consider public seminars on the topic. We will be taking every opportunity to stimulate discussion and debate.

Some personal observations

I would like to raise several issues by way of personal observation from my work on DTTB and contemplating the future television environment.

A unique role for DTTB?

By the time DTTB is introduced, we are likely to see a range of alternative

delivery vehicles for television (satellite, cable, MDS and terrestrial broadcast in the conventional television bands). All of these delivery methods are likely to be using digital compression techniques and be able to provide a much larger number of channels than at present. Early in the next century, we can expect to see wide availability of video-on-demand services, many more satellite DBS services, multi-channel cable and MDS (probably in the higher frequency bands), all used by consumers in the cities to get direct access to services without the need for direct cable connections.

I was recently surprised by the impact DBS multi-channel satellite services had on conventional terrestrial services in Holland and Germany. There, the national broadcasters found they were losing so much revenue to satellite that they are now providing their services both terrestrially and by satellite. They have discovered that DBS is far more cost efficient for delivery of programming to small communities and they have halted the decline in their revenues and, I understand, are regaining ground.

I am told that in Germany the terrestrial network for national broadcasters costs more than $100 million per year in operating overheads while the DBS service costs less than $15 million per channel. New communities are added at no cost to the broadcaster.

The national broadcasters in Germany and Holland are looking forward to digital compression on the satellite. This means while they may retain the full transponder, by using digital compression they will have the capacity to offer a new range of services able to restore localism and, perhaps, customer-specific services such as continuous news services. Similar developments are occurring in North America with the start of the 150 channel DBS service from DirectTV. A number of broadcasters have elected to provide programming to DirectTV as a way of enhancing audience penetration.

Many of the services on the 150 channel system will be quite specialised. For example, many channels will be used to cover college basketball, football and other sporting events. Followers of the various teams are scattered over the USA.

Perhaps sometime after the year 2000 we might see television programs from each Australian State widely available throughout Australia. Obviously, the cost would be prohibitive at present, but may not be with new delivery mechanisms that will become available.

The time has come for serious consideration of what might be the unique role of DTTB within the overall framework of future delivery arrangements.

What will DTTB be able to do to distinguish it from other delivery means? What will continue to justify use of the radiofrequency spectrum for terrestrial television broadcasting services after cable or satellite transmission becomes widely established?

Terrestrial free-to-air television is almost certain to remain the primary means of delivery of entertainment and information for many Australians for a number of years to come, DTTB will play a part. But this should not let us become complacent.

Change is inevitable, particularly after many Australians become accustomed to making their own program choices from the repertoire becoming available. I think that DTTB offers a range of new tools and opportunities for broadcasters and their program producers and marketing experts to meet the challenge and they need look at this as a new medium and explore the possibilities it offers. It would be a retrograde step to see it as simply replacement technology.

Legislation and policy

The current legislation, while encouraging new technology and services, continues to limit the number of services a broadcaster can provide within a market and the population reach they can achieve. It imposes different arrangements for satellite subscription television, cable and free-to-air broadcasting. These are necessary transitional arrangements which recognise the current limitations of technology. They are to be the subject of a review to be completed by the Minister before July 1997.

Unless DTTB services are regarded as narrowcast services, or were identical to the PAL service, the present legislation would, in my view, inhibit the provision of DTTB services by existing licensees within their existing markets. It would also restrict the option to provide multi-program services.

I mention this as an issue that needs to be resolved during the development of a policy framework for DTTB. The forthcoming review would seem to be the appropriate place to address this issue.

Standardisation of receivers?

Suggestions have been made that there should be a universal set-top decoder or a modular television receiver in future so that all of the alternative delivery systems can gain access to the video screen. No amount of standardisation will change the laws of physics which demand different transmission schemes for satellite, cable and broadcast transmission.

Nevertheless, the display and perhaps picture coding could be standardised, and standardisation of conditional access encryption systems is also possible, but perhaps less likely. While set-top decoder/converters will be necessary for consumers to gain access to these new services in the short term, the consumer will not be able to benefit from all of the features that digital transmission offers until purpose-built digital receivers become available.

For example, HDTV could not be displayed on a conventional narrow screen PAL receiver except as an image that was little better than the present

Continued on p.22

Continued from p.21

standard, if we disregard the impairments the converter/remodulator will introduce. Modular construction is commonplace for professional equipment, but there are very few examples of modular construction in the price-sensitive consumer products market. Furthermore, it can only work if there is standardisation of the module interfaces at the outset.

The future receiving system should allow for a variety of tranmsission systems to enter the home with much the same simplicity as electricity. A variety of different electrical appliances can use a common connection to the power supply; so to should it be possible for a display device, video recorder, or audio unit to access a common program bus. The transmission specific electronics would be a single box terminating at the household like an electricity meter. With a flexible system like this the consumer would be free to use display devices suited to the viewing application and would not require separate 'black boxes' for each receiver and service. To achieve this, standardisation of the 'bus' and 'interface' will be needed.

We need an 'open systems' approach that accommodates future development and one which can be shared by all types of home electronics.

Conclusion

DTTB will provide the means to take broadcast television through to the twenty first century. It will provide a platform for further developments that will enhance the system and the viewing experience. While it will present a substantial technical, economic, and programming challenge for broadcasters, it will also provide the means for them to compete with the new range of digital services that will be competing to deliver information, entertainment and other services to the public via the home and office video screen.

CHILDREN AND ADVERTISING: A FAIR GAME?

The 'Children and Advertising: a fair game?' conference in July was presented by Young Media Australia and sponsored by the ABA, the Institute for Values Research and the Federal Bureau of Consumer Affairs. The conference examined the issue of advertising directed at children.

Held in Sydney, the forum brought together interested parties including advertisers, broadcasters, community groups and regulators. The objective was to raise community, government and advertising industry awareness of children's needs concerning advertising and to consider the effectiveness of existing regulation.

Different perspectives were offered on the issue by a number of participants, including two academics from North America, Dr Dale Kunkel, Associate Professor of Communications, University of California, Santa Barbara, USA and Dr Andre Caron of the Centre for Youth and Media Studies, University of Montreal, Quebec, Canada.

The diverse presentations covered the existing regulatory framework, ethics, child development issues, the Canadian experience and avenues for action. Much of the debate centred on advertising aimed at children during programs directed towards the child audience. Discussion also focussed on young children's ability to distinguish between programs and non-program matter, and whether they would possess the cognitive skills to understand the persuasive intent of advertisements.

The forum culminated in a series of workshops to consider research, education, economics and legalities of advertising directed at children. The conference aimed at establishing a common ground from which all parties could work together to consider the issue more closely.

The conference was followed by a half day workshop, 'Children And Advertising: Future Directions', bringing together key players and experts in the field of advertising directed at children. The next edition of *ABA Update* will report on the outcomes of the workshop.

PROGRAMS GRANTED C OR P CLASSIFICATION

The following table contains programs granted C or P classification by the ABA between between 15 June and 15 July 1994. Producers interested in submitting programs for classification should contact Liz Gilchrist on (02) 334 7840.

Title	Origin	Classification	New/Renewal	Decision Date	Applicant
A*MAZING (Series 2)	Australia	C	new	27.6.1994	Southern Star Entertainment Pty Ltd
EYEWITNESS	UK	C	new	5.7.1994	MC Stuart and Associates
LITTLE MERMAID; THE (Series 2)	USA	C	new	4.7.1994	The Seven Network Limited
OCEAN GIRL 2	Australia	CAD	new	28.6.1994	Westbridge Productions Pty Ltd
SHIP TO SHORE 2	Australia	PRC	new	4.7.1994	Barron Films (Television) Limited