

Satellite capture of broadcast materials – archiving radio and television in the 21st century

Dr Bob Pymm
Manager, Collection Development
ScreenSound Australia (the National Screen and Sound
Archive).bob.pymm@screensound.gov.au

Thorsten Kaeding
Project Officer, Satellite Capture Program
ScreenSound Australia (the National Screen and Sound
Archive).thorsten.kaeding@screensound.gov.au

Abstract:

For many years, ScreenSound Australia has acquired a sampling of television and radio broadcasts for its collections. Traditionally this has been done by sending out blank stock to broadcasters who then copy the selected programs and return them to the Archive. With the advent of satellite broadcasting, it is now possible to establish a real-time capture program which enables programs to be captured, catalogued and made available. This paper will look at establishment of a capture pilot program, some of the technical issues involved, problems of selection, and permissions and rights, cataloguing and making content available and impact on workflow practices and procedures.

Background

Since its establishment in 1984, ScreenSound Australia, the National Screen and Sound Archive, has been involved in selecting, preserving and giving access to a representative selection of Australian television and radio programming. As part of the Australian Film Commission, the Archive has a legislative requirement to collect, preserve and make accessible Australia's audio-visual output. With a collection of around a million a/v items, together with supporting documentation such as scripts, posters etc., ScreenSound Australia aims to acquire materials from across the entire gamut of Australian film, television, radio and sound recording industries.

Unlike print materials, the audio-visual media in Australia, including broadcast programs, are not covered by any form of legal deposit legislation making producers responsible for lodging copies of their productions with a central collecting agency. Thus preservation of this material has been less assured than for paper-based items with the result that there are gaps and inconsistencies across the entire range in what has or has not survived. For earlier years in particular, individual producers did not see the need, or could not justify the cost, in building and maintaining program archives.

In recent times this has changed somewhat and program archives are now actively maintained by the major broadcasters who see this historic material as a valuable asset with potential for future exploitation. While this is reassuring in ensuring material survives, it does not help make these items available to the general public who usually have no access to any of these, essentially commercial, archives. Thus the role of a national archive such as ScreenSound Australia continues to be important as a key provider in offering public access to as broad a range of material as possible, from all eras of our audio-visual history. With the growth and potential for online delivery of material making access so much more widely available, capturing programs in a digital form will provide the basis for this future delivery mechanism. With improved rights management processes, not only program makers, but also interested researchers or individuals will benefit from simplified and more efficient access.

Over the last few years ScreenSound has, on an international level, been at the forefront of digitisation of its collection. In an international context Australia is unique in the amount of broadcast material available over satellite systems. Due to Australia's geographical size and relatively sparse population, satellite transmission is used more extensively here than in many more densely populated countries. With many programs being unique to this form of delivery, capture of a representative sample of this material has become an increasingly necessary step in building the National Collection.

The current system

Traditionally, the Archive has collected broadcast material in four major ways:

1. Requests to broadcasters for copies of specific productions, eg. award-winning or milestone programs. Thus ScreenSound will actively target material identified through various commercial publications, award ceremonies, public interest, press releases, public controversy etc. Once identified the producers are contacted and hopefully, a broadcast quality copy of the program acquired together with any useful cataloguing information

that may be available. This is not always a straightforward process and can be very time-consuming. Of course, there is no obligation on the part of producers to meet our request and we rely on goodwill, and the knowledge that their production will be properly archived, cared for and made accessible to future generations to encourage their donation. Note that while we acquire the physical item we do not usually acquire any intellectual rights in the material – these remain with the producers. For use other than as reference material in the Archive, clients usually need to get permission from the rights owners.

2. For news and current affairs, where there is predictable and regular production and broadcasting, ScreenSound has attempted to simplify the acquisition process through establishing rosters designed to capture broadcasts from designated producers covering the broad spectrum of both commercial and community output from a range of geographical locations. The current television news roster aims to acquire one hour's broadcasting per night of the main news and current affairs program from one specific station, each night for two weeks. The aim is to provide a broad geographic spread of stations and to include regional news where appropriate. Thus one fortnight the capture may come from a Sydney based broadcaster, the following fortnight from Mildura etc. This is a continuous, rolling roster, planned well in advance, with ScreenSound providing blank tape stock to the station which then copies down the broadcasts and returns the tapes, with copies of running sheets or scripts, to our Collection Development section for processing.
3. The Archive acquires much of its retrospective broadcast material by being offered programs from producers who consider that their commercial life has ended. This material may often be on obsolete or damaged formats which brings with it a preservation work load that has to be factored in to the overall decision as to how much of the material to acquire. This is just one of the factors involved in the decision that also includes cultural significance, extent of our existing holdings in this area, likelihood to be held elsewhere etc. Some early formats, such as 2 inch video tape, are also large and heavy, bringing in the additional concern of handling, storage space and of course, the availability of playback equipment.
4. ScreenSound has also experimented with dubbing both radio and television programs directly off-air to tape (after first having gained permission from the broadcasters!). This has been more successful for radio than for television, but has not been actively pursued to any large degree, because of the often poor copy quality of the resultant recordings due to signal and technical constraints. While this copy is usually acceptable for reference purposes it is not of sufficient quality to be able to be reused or re-broadcast in another production and is thus not seen as the best method for long term preservation. In addition, dubbing off air restricts capture to a narrow geographical area through reliance on the terrestrial signals received in that area.

Current limitations

The acquisition methods described above, being the only ones available to the Archive up until now, have a number of in-built limitations. Firstly, the methods described are not conducive to flexibility in selecting and capturing programs as they air. Thus changing the news roster when it is planned six months ahead is difficult. Also, obtaining good coverage of

regional material is not always easy with small, local radio and TV stations not willing to be part of what is for them, a time-consuming and tedious business for which they can see no immediate return. Sometimes stations agree to be part of the roster only to drop out later due to staffing changes, downsizing, change of ownership etc. The last few years in particular has seen the numbers of staff involved in the production and presentation of television news falling across the spectrum. Cost cutting efficiencies and increasing automation has seen smaller broadcasters cut staff numbers to the minimum. In this situation, expecting an already very busy area to make time to copy tapes, package them appropriately, include running sheets, and post or courier the resultant package back to the Archive can be expecting too much.

In addition, when a major event occurs, such as the Canberra bush fires or September 11th, there is a need to acquire a far broader representation of the news and current affairs broadcasts dealing with these issues – again placing extra work on both broadcasters and the Archive in organising the acquisition of this material.

The physical task involved in maintaining rosters and providing blank tape stock (both video and audio) is labour intensive, requiring constant administrative attention and frequent follow up contact. Ensuring tapes are received by the rostered broadcasters in time, ensuring they actually use them and return them once their period is completed and reminding them to send scripts or running sheets (usually still physical pieces of paper) takes a lot of staff time in the Collection Development area of ScreenSound. Regularly, the running sheets, vital for cataloguing, are not acquired due to the broadcasters lack of concern over this aspect – once they have finished with the tapes, out they go.

Under the current system, there is a tendency to over representation of larger networks and a narrow geographical area (Sydney, Melbourne, Canberra). This is largely due to the established links we already have, ensuring a level of understanding and commitment to the process which helps it run more smoothly and to the level of staffing enjoyed by the majors. For smaller, less well established broadcasters, the extra work entailed with copying and sending out the tapes is one additional task they are tempted to avoid if work pressures increase or resources are reduced.

Finally, for older material, there is an over reliance on items being offered to ScreenSound rather than being actively sought. If sufficient care is not taken, this can lead to imbalance in holdings and gaps which, as time progresses, get harder to fill.

Initial trials

With the decreasing costs of computer storage and with the Archive in general moving to storing other recordings (particularly sound at this stage) in digital form, it was decided to investigate the capture and storage of radio broadcasts directly to the server, rather than dubbing down on to audiotape as had been tried in the past. Thus in late 2001 ScreenSound began a limited trial of direct capture of radio broadcasts to the server.

Over the six weeks of the 2001 Federal Election campaign the Archive recorded terrestrial radio broadcasts of national radio news (from Art Sound FM Canberra) and the Community Broadcast Association of Australia (CBAA) funded current affairs program *Undercurrents* (from 2XX Canberra). The choice of these programs was governed by what could be

received clearly in our Canberra office and by the fact that they represented a good cross section of opinion from mainstream to the community sector. (Note that the ABC archives its own material).

These programs were captured through connecting a standard radio receiver directly to a networked PC. Software used included Wavelab (audio editing and mastering program) and Cybercorder (radio broadcast capturing software that provides capabilities such as programming capture start and stop times for the week in advance, having pre set mixer profiles to obtain the best recording etc).

While these trials proved successful in terms of being able to capture, edit and store radio content as WAV files the reliance on terrestrial reception devices meant that the old problem of sound quality arose, with extremely variable results depending on signal strength and interference. Early on, the decision was made that for preservation purposes, WAV files, as the highest quality capture format, would be created and archived wherever possible and that access would be provide through smaller, MP3 files created from the WAV file.

The satellite alternative

Given the issues described above with respect to the limiting nature of reliance on broadcasters, direct capture in a narrow geographical area and the poor quality of direct capture from terrestrial broadcasting, it was decided to investigate the satellite option. With satellite broadcasting, a well established practice both here and overseas (it started around 1976 in the US), it appeared that this might be a cost effective and practical solution for some of the difficulties being encountered.

Hundreds of channels, from the ABC to tiny, community stations, are being handled by the two Optus satellites B1 and B3, stationed 23,000 miles (around 37,000km) in geosynchronous (ie. stationary) orbit above the earth. Broadcasters lease channel space on the satellite, and signals from a broadcaster are uplifted and received by the satellite, boosted for their return journey and then sent back to earth on the chosen frequency where they are received by a dish, boosted again and converted by the receiver attached to the dish. This piece of hardware ensures the digital signal can be understood by an old, analogue television and also serves as a security device to ensure you can only receive the signals to which you are subscribed.

In addition, the nature and extent of material potentially available for archiving has also changed with the advent of satellite services, community television and pay television. Thus not only has the landscape of Australian broadcasting substantially changed in terms of the delivery mechanisms (digital) used but also in the diversity of content available.¹

The increase of content available in digital form meant ScreenSound could now be in a position to record “off-air” a variety of material with confidence in the quality of signal and therefore sound and picture quality. It also meant the Archive would no longer be reliant on storage on physical media such as video or audiotape. However, in order to be in a position to exploit these technologies, it did mean that a reasonably substantial investment in infrastructure was necessary. Thus not only satellite dishes and receivers would be required, but also a major increase in computer storage capacity would be necessary to handle the envisaged increase in digital video capture and storage in an online or near line environment.

Given the obvious advantages and potential that satellite capture offered, the Archive committed resources to the project and the program commenced operation in October 2003.

Satellite capture equipment

In order to begin the process of direct capture, one or more satellite dishes with associated receivers had to be installed. Following conversations with broadcasters and with a local dish supplier, it was decided that, given the resources available and the experimental nature of this pilot project, three dishes would be purchased and installed. Each dish would be dedicated to a particular service provider offering a wide range of programming options, both radio and television, from which we may select material for archiving.

Dish 1 is located at the main Archive storage facility in the Canberra suburb of Mitchell. Installation here was necessary due to the size of the dish (2.8m) making it inappropriate to be placed on the roof of the main Archive building, which is covered by heritage legislation affecting the use of the building fabric. This dish is specifically designed to receive lower powered signals within a narrow bandwidth, hence the need for size. Initially it will be directed to capture material from the 2UE radio network. All broadcasts are in MPEG-2 compressed format and thus, this is the format in which they will be captured and stored as preservation items (converting into WAV files would not make sense – the compression cannot be undone). At this stage, the files are saved as ‘temporary’ and, later when time allows, properly accessioned and transferred to the mass storage device in the main Archive building via fibre optic cable.

Initially, it is anticipated that one hour of programming a day will be captured. This will be reviewed once all systems have bedded down. Storage estimates are around 400MB per hour of radio broadcast – fairly minimal in the bigger picture.

Dishes 2 and 3 and their receivers have been installed on the roof of the main Archive building. Being substantially smaller and less intrusive, they have proven acceptable within the heritage constraints on building use. These 90cm dishes are directed to Optus B1 and B3 satellites.

Dish 2 will target television broadcasting, selecting from the wide range of material available on the Austar network. Dish 3 will capture radio broadcasts from the community sector, using software supplied through the CBAA (Community Broadcasters Association of Australia). The CBAA provides satellite transmissions of radio programs sourced from community radio stations from around the country and thus provides a wide range of material, often with alternative views and opinions that are not found on the mainstream commercial media.

Again, these broadcasts are in MPEG-2 compressed format and again, will be saved to a ‘temporary file’ and then accessioned and stored on the storage device. Initially it is anticipated that two hours of TV programming will be captured per day together with one hour of CBAA radio. This will be reviewed once the pilot study is completed.

Early storage estimates were around 3.5 gig per hour of video. However, from our initial captured files, it seems to work out closer to 2 gig per hour. Again, not too much of an issue, given that we are now talking in terabytes when it comes to upgrading our storage facility,

with the possibility that a near line tape handling device will be installed in the near future, capable of storing and retrieving, in a matter of seconds, hundreds of terabytes of information.

One problem that requires further investigation and at the moment seems intractable is the use of these compressed video files for preservation and future re-broadcast. The files make a good access medium – they can be viewed comfortably at something approaching DVD quality. However, if a future broadcaster wishes to edit some of this file for use in a future program, the quality that will end up being broadcast will be less than ideal. Resolving the issue is a primary concern of this pilot project.

Initial capture

Given the volume of programming available through satellite broadcasting and the obvious desire to build as comprehensive a collection as possible, there is a tendency to want to capture more material than can be properly processed. Thus the ease of capture, using a program such as Cybercorder to start and stop the capture process, plus the lack of a physical entity taking up valuable space in a storage facility, make it tempting to download more material than can be properly described and catalogued. This has been very much in our minds in this early stage of the new initiative and thus we have been extremely careful in targeting particular program types and the volume captured. Using existing guidelines that have been applied for many years in the analogue world, the Archive will continue to aim for one hour of TV news and current affairs per night together with one hour of other TV broadcasting. This might be say, one hour of the shopping channel (taken perhaps every six months), one hour of a popular series (sampled far more regularly) or the complete run of a popular ‘reality’ show.

For radio, talk back is the major component captured from the commercial world. In addition, for the CBAA radio broadcasters, regular community and other local productions will also be captured.

One of the major considerations in designing any capture program is our ability to obtain permission to copy and store programs from the program producers. This can be a time-consuming and sometimes difficult process, which we are hoping to streamline in this new environment. Historically, for material offered in an ad hoc manner, ScreenSound has generally received permissions for storage and provision of access at the time programs were donated by the producers. For scheduled activities, such as the news gathering program, permission has to be obtained before a particular station is added to the roster and tapes despatched.

The advent of relatively easy direct capture, requiring no effort from the program producers and less effort on our part (and thus the potential to acquire more), has made it necessary to rethink a number of issues, including permissions, future storage, cataloguing loads etc., leading us to adopt fundamentally different approaches to many of these challenges.

Rather than obtain permission to record individual programs, authorisation is being sought from both the CBAA and 2UE radio networks to capture any of the programs transmitted on their satellite services. This is likely to be successful in the case of radio but more problematic with television where carriers such as Austar are not able to give us such blanket

permissions – the Archive has to obtain it from the program producers themselves on an individual basis, more or less as is done now. Gaining permissions can be a time-consuming process requiring follow up emails or phone calls, relying to a large degree on the goodwill of the producers. This has always been the case and obtaining some form of legislative backing for the acquisition and archiving of broadcast output would remove this sometimes difficult and demanding step.

Selection methodology

Satellite transmissions and the ready ability to directly capture programs gives ScreenSound the opportunity to acquire far more material from across the entire spectrum of broadcasting than has previously been possible. It raises the question of whether a targeted or more wide-ranging approach to acquisition should be taken. Both have their merits and their drawbacks.

- **Targeted acquisition:** aims to capture specifically targeted programs based on their content and relevance to the national collection. This requires planning and intellectual decisions as to what to acquire, how frequently etc. The Archive ends up with a smaller but more targeted collection.
- **Trawling:** aims to capture blocks of programming from particular sources, or genres or periods. Thus all programming for a particular day could be captured as a ‘snapshot’ of what was being produced at that time; or all children’s programming over a given period. This approach reduces the level of intellectual decision-making needed for the acquisition process and leads to a larger amount of material being acquired. It can also be of interest to future researchers who wish to gain a ‘big picture’ view of broadcasting at a particular time.

Given that the major objectives of the pilot capture project are to bed-in and properly understand the technology, assess the impact of this new acquisition process on existing activities and gain an understanding of the workload involved in archiving and cataloguing the captured files, it was decided that the Archive would continue with the targeted method of capture. This ensures that only small amounts of material are acquired in the initial phase, giving time to allow for difficulties, unforeseen circumstances and testing of assumptions. It would also be easier to obtain the necessary permissions, particularly for television broadcasts.

Cataloguing, description and access

As already noted, the relative ease with which it is possible to capture program broadcasts makes it possible for the Archive to considerably increase the amount of material acquired. However, storing on disk is one thing, creating meaningful catalogue entries to assist with the discovery of material is another. Under the ‘analogue’ approach, television stations supplied copies of scripts with the news videotapes in order to assist in cataloguing. The scripts are invaluable in this and when not sent (which occurs relatively regularly), auditioning tapes in order to glean the necessary cataloguing information becomes a time-consuming business.

For programs captured from the satellite, there is no readily available physical script to go with the broadcast. One option would be to approach the stations and ask for the scripts to be sent to ScreenSound. This would ideally be in electronic form, eg. an email attachment, based on files they create as teleprompts for use by the newsreaders. These files could then be directly input into the Archive's collection management database as summaries and have users rely on keyword searching for access. Optionally, the Archive may choose to edit the files, create more succinct summaries and create subject headings based on our existing thesaurus terms. This would undoubtedly be the preferred approach and, given that time is being saved in handling the physical items, should be possible if acquisition levels are maintained at current levels. This approach seems relatively straightforward, with little effort required on behalf of the broadcasters. However, in initial discussions regarding implementing this, television stations have evinced little enthusiasm for adopting the idea, claiming it was another workload they just did not want to be bothered with.

Alternatively the Archive could of course audition each of the programs captured to acquire cataloguing information. This would work as it does with the analogue tapes, but is a time-consuming process and if done for each captured program would restrict severely the volume of material that could be archived (assuming ScreenSound did not wish to build a large backlog of files awaiting cataloguing).

Another automated approach under investigation is to use the captioning information packaged up with most news broadcasts. This information, broadcast at the same time as the program, provides the text of what is being said in an encodable 'track' available to those with the right decoding software. It is aimed primarily for the hearing impaired but could probably be gathered for our purposes. This approach was considered by the Archive nearly ten years ago when it was hoped to use the caption track from videotapes to provide the keyword indexing for news. However, issues to do with the small number of news programs that were actually captioned and the rights issues involved with the caption information made this a less practical option at that time. In the new environment operating today, this approach certainly deserves to be revisited and may well prove a practical alternative, requiring no work at all from the broadcasters. Again, there would be the issue of editing the data if desired and the creation of controlled name and subject headings. There will also be the question of obtaining permission to use the captions which in many cases, will be copyrighted to the Australian Caption Centre.

Finally, there is the issue of segmenting files in order to break out news stories into their discrete 'chunks'. With traditional, analogue systems, time codes were superimposed onto videotape in order that researchers could use this data to identify the start and stop times of footage that was being selected. Creating a similar code in the digital file should be possible using the timing information attached to each packet of data. It is another area that will require further investigation and the use of some sophisticated software.

Before any captured file is catalogued and made available, it will be necessary to check the file to ensure it has been captured correctly and that header or trailer information (and in some cases metadata) is kept or edited as appropriate. While the scheduling and capture can be automated, in the initial period at least, this checking and review process will be very necessary. Once well established, it may be that this process can be dispensed with – after all, we don't review every videotape received to ensure that its contents are of appropriate technical quality and that what is said on the container matches what is actually there.

In conclusion...

To better achieve ScreenSound's legislative requirement of collecting across the broad spectrum of Australia's audio-visual output, the pilot project has demonstrated that it is rapidly becoming a highly cost effective method of capturing broadcast material from across a wide range of media and geographical location.

Developments within the industry such as staff cutbacks and efficiencies driven by broadcasters working in an increasingly competitive market, have led to physical media such as video tape, audio tape or compact discs rapidly losing favour as media for the production and distribution of programming. Given these changes, an archive such as ScreenSound Australia has to change its practices in order to continue its primary role of acquisition, preservation and access. Lacking the imperative of legal deposit legislation, chasing and acquiring important broadcast materials will continue to be a case of keeping up with the technology, persuading and cajoling, and devising better and more efficient systems in order to build an archive truly representative of all the major currents of Australian life. The satellite capture approach offers many long term advantages for ScreenSound to achieve its mission, to capture, archive and provide new access modes to our audiovisual cultural heritage.

1. The Broadcast Australia web site provides a good overview of the various broadcasting approaches operating in Australia – see http://www.broadcaustralia.com.au/tv_industry.html. In addition, for a detailed review of the social, technical and legal aspects of satellite broadcasting, refer to this South African web site: <http://iba.org.za/satellite.htm>.