

## **Making Connections – How the NFSA is Digitising its Videotape Collection**

### **By Richard Vorobieff, Senior Video Preservation Specialist**

In October 2015, the National Film and Sound Archive (NFSA) released the report *Deadline 2025: Collections at Risk*. The report was a call to arms to digitise the magnetic video and audio tape holdings of Australia's National Collecting institutions.

In 2020 and again in late 2021, the NFSA received additional funding from the Federal Government. This was to digitise not only the NFSA's collection, which is based in Canberra, but also the collections of other Australian National Collecting Institutions (NCIs).

Video Services is responsible for the digitisation of videotape from 2" Quadruplex recordings to HDCamSR, including every format made available in Australia over 60 years. The collection continues to grow with the closure of many television stations, making our task greater still.

Since 2016, we have gone from 4 streams of video capture to 31 and encountered a range of problems, all of which have needed solutions.

Underlying all our solutions has been our ability to make connections. *Deadline 2025* has often been characterised as tapes being unplayable beyond 2025. The problems we all face with *Deadline 2025* comes down to people. The people who know how to repair equipment, operate videorecorders and managers who understand the operation of a video chain. All three roles are different, with their own unique skills. None can work without the other.

In this talk I will be expanding upon the need for making connections and demonstrating a range of solutions we've made to digitise our collection and that of the other NCIs.

#### **Managers – Making Things Happen and Setting the Tone**

Managers have the challenges of finding and hiring staff, educating staff in video systems, sourcing equipment, accountability for video digitisation beyond 2025 and providing technical advice to the archive and public.

#### **Engineers – Sharing Knowledge and Being Creative**

Engineers don't just connect and repair video systems, they're essential to the ongoing maintenance, sharing of knowledge and using their knowledge creatively to solve all manner of technical problems.

#### **Operators – Doing It Right and Doing It Once**

Tape operators are responsible for the cleaning and the digitisation of tapes. Ideally their work needs to be done right and done once – though this depends on each tape. Some may take many attempts to get right. They are not mindlessly digitising, they are aware of the content and ensure their machines are performing properly.

With managers, engineers and operators working together we have been able to increase the digitisation of the NFSA's videotape collection. Finally, I will briefly suggest a way forward to cooperate and share video skills.

Before I come to the different people involved in digitisation, I want to outline the task we've been given at the NFSA in a little more detail.

We have about 37,100 recordings that are unique video tapes that are yet to be digitised. We then have a further 20,200 tapes where we hold more than one copy of that title – many of these have been format shifted from one tape format to another. That is we've made a copy of the preservation tape to another tape format. Ideally we would return to the preservation tape over the copy.

Based on those numbers we can say that there's 57,000 tapes that need to be digitised. These are just the tapes in our collection at the moment – each month approximately 600 tapes are added to our collection.

We're also digitising tapes from other National Collecting Institutions too, this is estimated to be 15,000 tapes. I think we can say that we have about 72,000 tapes to copy.

Deadline 2025 set out with the target of copying 50,000 tapes. Last financial year we digitised more than 9,000 videotapes. Deadline 2025 then set out to copy 105,000 audiovisual collection items between 2022-2025 (regardless of media format).

Then there's the long tail – which for operators, engineers and managers is about risk and strategy.

Risks include having enough equipment, spares, trained engineers and staff to replay a large variety of formats well into the future.

The long tail covers the hundreds of thousands of videotapes that are still out there waiting to be collected. The NFSA now only gets videotapes by donation. That is a person, or a company, offers a collection of tapes to us and our curatorial team decide whether or not they meet our selection criteria. We are then charged with preserving those reels, by digitisation and passive preservation (or storage).

Before I joined the NFSA, I worked in a commercial television station archive and we had 194,000 videotapes in one library alone. That collection spanned videotapes from 2" to HDCamSR, and almost every professional format in between. Even a highly conservative donation of 10% of that collection amounts to 19,400 tapes, taking a considerable time to catalogue even before it comes to digitisation which might take a little over two years to do (provided the entire team was engaged in that task to the exclusion of all other video digitisation tasks).

We know that most broadcasters and production companies will offer us tapes long into the future. Even though most ceased recording and production on tape around 2016. If that's

representative of a national broadcaster, there's likely to be hundreds of thousands of potential tapes to collect, preserve and share in Australia alone.

Our digitisation efforts work along three different organising principles -

- i. Access Requests
- ii. National Collecting Institution batches, and
- iii. Preservation Queue batches

Access requests are given the highest priority as these are for in-house and external users like production companies and members of the public seeking paid access to our collection. This is followed very closely by batches coming from National Collecting Institutions. (NCIs). Our funding is tied to the digitisation of these tapes, so we must be accountable in our efforts.

Finally we have our preservation queue. That's the 57,000 odd tapes that make up the NFSA's own collection. These are blocked into batches of twenty, by format, with Curatorial determining specific content for digitisation. Video Services have input into how these queues are organised. We also encourage video staff to let us know what series or programmes they like, so we can break up their work a bit too. People who copy shows that they enjoy are more motivated when they have something to look forward to.

### **Operators**

Let's look at people like me, operators. Our goal is to do it right and do it once.

Operators work in one of three areas -

- i. The main rack where the most complex and older formats can be copied on a one to one basis using Samma Solos or straight into an Edit Suite.
- ii. CinCity 1 and 2 are two small suites with a Cinedeck in each allowing a total of eight streams of video. These have a small number of multi-format Digital Betacam video recorders, an HDCam and a 1" VTR each.
- iii. Cineworld consists of four capture stations using four Cinedecks making 16 streams of video capture. There are a wide range of video recorders from professional formats ranging from 1", the Betacam family, HDCamSR and VHS, totalling more than 24 machines.

The Cinedecks are there to capture what we consider to be the easier formats. Where the tapes are badly degraded or problematic the operator can perform conservation treatments like baking and extra cleaning. They can also pass the tape to a more senior operator for assessment and copying.

The best thing that we do in Video Services that has enabled us to copy as much as we have has been to work together. We're always collaborating and talking to one another about what we're working on. This is informal and goes on constantly.

We're engaged in a marathon effort, rather than a sprint, to copy these tapes so it's essential we can identify what's working and what's not.

This starts from the moment a staff member joins video services, be it as an entry level job cleaning and preparing tapes for digitisation, or as an operator. The Senior Specialists train

new staff. We're sharing knowledge and skills. All tape operators have had to learn from scratch. We first try to determine how each new staff member learns, some staff know how they learn, others do not. It's essential that trainers have empathy. A trainer with empathy knows when to take breaks in teaching and let the person being trained ask whatever questions they like without judgement.

Having come from television training people in archives and video I have tried to simplify and standardise how we train here, so that every cleaner and operator realises there's very little difference between the formats. To paraphrase Gertrude Stein, a tape is a tape is a tape.

The cleaner role has been instrumental to our success. This role is an introduction to tape and the cleaner is responsible for checking incoming batches, updating technical metadata (which introduces them to the catalogue), and the cleaning and repair of tapes. They work across 1", the Betacam family and VHS. Complex formats like 2", J-Format and Umatic are cleaned by the operators copying these tapes. The cleaner has increased our output significantly as operators can concentrate on digitisation.

Operator training starts with a reliable analogue broadcast format like Betacam Oxide then progresses through the rest of the Betacam family. We have written an illustrated training guide to explain the broadcast standards and the use of measurement equipment. We have a complete manual to describe each of the video formats held in our collection and their use in Australia. There is then a training checklist which is used as a guide for training and milestones where staff are then moved onto different formats.

Video is a skill that can only be learnt by doing. The more you do and the more you experience, the easier it is to know what's wrong with a tape and how to get the best from each reel. When things do go wrong, we treat this as a learning experience. Our workplace culture, is to create an easy-going environment where people can make mistakes, and that they are comfortable to seek help and are then responsible for fixing those mistakes. There's no value gained from an atmosphere in which staff feel they have to hide mistakes and try to be perfect.

The benefit of this culture is there for everyone to see. Every operator in our team does their utmost to get the best out of each tape they work on, regardless of the content. We all help each other to identify stocks or problematic batches of tapes. We're meticulous in our note-taking for faults. We keep a note of troublesome tapes and offer feedback on how these can be progressed through the preservation queue better.

Operators are hands on with the collection and are therefore the eyes and ears of the collection. They have the assistance of automated quality control software called Baton, but they pick up most faults before their tapes go through QC software. We think of QC software as a safety net, to pick up those faults which are harder to spot when copying four tapes at once.

Being the eyes and ears of the collection, we experience more of the collection than anyone else - we have chosen to share this knowledge.

We are publishing a page on our NFSA internal intranet of monthly digitisation outcomes, highlights (that is interesting content we've found) and a preservation feature that explores videotape and how we work with it.

This has uncovered many clips that have gone on to be hugely popular and some have been republished online to the public via Facebook.

Through the preservation feature we have started closing the knowledge gap on video. Most people within the Archive have a great understanding of cine-film. I've lost count of the number of times I've been asked why my tape doesn't have perforations! Having this monthly feature available to the whole organisation has allowed us to demystify videotape and educate a wide audience in an entertaining and accessible way.

It has built our profile and most importantly increased empathy and understanding of what we do. We're behind the scenes people, so today's talk is something of an outlier. Having this way of showing people what we do (that they can access at their own leisure) has brought us out of the shadows. We also make sure all our tours, be they for new starters, stakeholders or members of parliament are engaging and entertaining.

### **Engineers – Sharing Knowledge and Being Creative**

Operators and engineers work very closely together. Operators have to be able to tell an engineer what has gone wrong with their video recorder in order for the engineer to fix it. This is a collaboration, because the operator will be taught by the engineer what went wrong and how the machine was fixed.

Engineering at the NFSA has been complex and that's just the people side of the equation. We were without a fulltime video engineer and had to contract engineering services. Through this contractor relationship we have gained a valuable resource of knowledge and creative problem solving. We are also very grateful to our contractor, Kev, for also helping in training a full-time engineer in video this year.

The skills of a video engineer require more than just an understanding of electronics. It's a whole different world of analogue and digital signals. While we have an exhaustive collection of manuals these do not in any way make up for experience. When you bought a video recorder new, this was accompanied by a manual and training from companies like Ampex, Bosch and Sony for engineers. These courses were held to teach engineers how to service machines properly and are vital to many diagnostic and repair tasks.

Engineering is broader than just repairs. There's a stock of spares that need to be sought from video heads, to pinch rollers and integrated circuits. Many of these items can still be bought from America. However, it's getting harder and harder to get most spares including buttons, switches and gears.

Devices we were able to buy in 2021 are simply no longer made at all - Analogue to Digital SDI converters are no longer made by anyone. Timebase correctors and synchronisers are very hard to buy with only one company making these. Many items are prohibitively expensive - like tape cleaners.

How have we managed to do so well?

It all comes down to working together and having relationships with the broadcasters. Our Curatorial team is regularly working with broadcasters, as they have closed their studios they have offered us their surplus equipment. We have gone through and collected what we could get that's useful to us, no matter what condition it's in.

We have been actively searching Facebook Marketplace, Gumtree and Ebay with extraordinary results in the last four years. We managed to buy a brand new HDCamSR, two NTSC DPS-475 digital timebase correctors and a very rare Sony UV/EV-type 1" videocorder. All for very good prices. The latter (the Sony UV/EV-type videocorder) needed five months of work from our engineer to get it working properly, but we can say that it's likely to be the only working one of its kind in Australia.

Through conversation we learnt that a major Sydney production house had gone into receivership and we were able to bid on their equipment at an auction. Through strategic bidding on lots we got enough spares and working gear to keep us going beyond 2025, we hope. Among this haul was a brand-new Panasonic D5-HD deck, a Betacam tape cleaner worth \$60,000 new, many Digital Betacam video recorders and a range of NTSC machines we needed. We also got a D9 video recorder.

There has of course been a plan behind this. We have a list of equipment we're after. We're looking for equipment we can use that complements what we have, or fills a gap in our abilities. The Sony UV/EV 1" took five years of searching to find. We never thought we'd get a D5-HD, but we did.

We have also been trying to make gradual improvements. With the Engineer's knowledge we have sought a large number of TBCs so we could make our Umatics Digital - that is, we can correct the video before it's converted into SDI. We have also dramatically improved our handling of this format by seeking more BVU machines and a wider range of decks so we can keep trying the tapes on different machines until we get the best playback.

One of the largest builds in Video Services aside from Cineworld which was enabled by Government funding in 2020, was rebuilding our main rack. We moved from a routing system comprised of composite and component analogue, SDI and HD-SDI, to a solely SDI environment. This replaced a large router switcher that we feared would fail. Cineworld itself required enough equipment to re-create our main rack, so much has been bought to allow us to scale up our capacity.

Tape cleaning has been a major challenge. Tape cleaners are hard to repair when they fail. We have a new challenge - cleaning tissue. We are looking to have our tissue slit, rather than buying it as pre-cut rolls. The exchange rate is so high, that it's looking like it would be cheaper to buy the Pellon (cleaning ribbon) as large rolls, then cut and wind the tissue onto cardboard cores inhouse.

We also need to make greater inroads into the 15,000 strong 1" collection we have. To this end Kev, our contractor, was approached with the problem. He came up with a tape cleaner based on similar Merlin modifications to the Ampex VPR6 VTR. The tape is cleaned and wrapped around the video head, with two tissue rollers. The tissue is driven by motors

which are controlled by the VTR's transport output serial pin. We otherwise wouldn't have used this VTR as we're only operating Sony 1" machines at the NFSA for digitisation.

Our Engineers also help our operators better use their equipment. For example an RF line out was made for both the J-Format and the UV/EV Type 1" so the operator could adjust the tracking using an oscilloscope, making replay much easier.

One thing we are looking to do is to do some 3D printing. This is for totally unavailable plastic and nylon parts. The trouble we have encountered at this prototype stage is that these are precision parts, so they're hard to design and print. We have a long way to go before we can fabricate unavailable parts with a 3D printer.

Without Engineers, we are nothing.

### **Managers – Making Things Happen and Setting the Tone**

Managers have two big tasks – to manage and lead. These are two separate skills. I've characterised this as management makes things happen and leadership sets the tone. Digitisation managers work with a small team of specialists like engineers, video experts and operators to achieve the NFSA's digitisation outcomes. Working together we've been able to achieve some great results.

The biggest management challenge faced is staffing. That includes finding, hiring and keeping staff. Ideally managers want staff who have broadcast videotape experience. However, most television stations have long ceased using tape. Those who have been tape operators are usually in their late 40s or 50s. They have established careers, lives and homes. Asking them to return to being tape operators and leave a larger city for Canberra is a big ask.

What Video Service's managers have done is to hire staff with adjacent skills. We have hired many ex-television presentation and master control operators. They understand how broadcast operations work, so they're familiar with how television goes to air.

Now we're hiring university graduates and younger staff who have done courses in media and film production. We also hire conservators. Conservators have a slightly different professional practice, in that they're trained to conserve materials – it's very different to their normal practice and each has taken to video really well.

The first question we ask applicants is 'why do you want to join the NFSA and what do you know about us?' People who know what we do and are interested in our collection make great staff.

By hiring outside of broadcast and production, managers have been able to create a more diverse workforce that better reflects our community.

Managers have to help guide and plan the careers of each of the staff they lead – there is no straightforward career progression path for operators into other roles. There are no formal courses in video any more. Managers cannot send their staff out to learn about this in a college or TAFE. As I said earlier all the training we do is on the job and is training through

mentoring. The courses a manager can send staff on are in adjacent video skills like non-linear editing, colour grading and public service skills.

These are ways to broaden the skills staff have, so when we've finished digitising our videotape holdings, managers can progress staff into other areas of the NFSA. Public service courses give staff opportunities beyond the Archive.

Managers are responsible for buying equipment and budgeting. They have to do this according to stringent guidelines set out by Government policies. Sometimes this involves complex procurement processes. They take the advice of operators and engineers when engaging in this process to identify what is needed and the precise specifications required to do the job properly. Much of the time it's hard to buy anything new, so much of what is bought is secondhand and requires documentation in the form of statutory declarations.

Managers have to negotiate the competing priorities of the organisation.

With three ways of organising the digitisation of tapes, the manager has to be a gatekeeper to the team's services. They have to be aware of the resources at hand - both people and equipment. This can be very challenging, especially when there are tight deadlines for digitisation tasks. They may have to break tasks up into more easily achievable chunks, or at worst seek more time. Flexibility is only possible through working together and being clear about what is needed and what can realistically be done.

Everyone has to be aware of likely WH&S problems and sort them proactively.

Recently this saw Video Services play a leading role in demonstrating a best practice model for handling distressing content. We have long been actively preventing instances of vicarious trauma caused by watching distressing content. This is done by ensuring everyone feels safe to stop any tape they don't feel comfortable watching and taking that tape to be assessed by a senior operator or manager. There is no shame or judgement against an operator saying they can't watch something because it's distressing.

At present we have a good problem coming out of our successes in buying and receiving donations of equipment, and that is physical space. It's all well and good to have almost complete spare parts coverage for the future, but those machines and spares need to be organised and stored for the long term. Real estate for equipment is hard to come by. It will be an ongoing challenge to collaborate with both our Collection Storage team and our Facilities managers to ensure we can access our equipment as we need it.

The manager's job is a tricky one, they are responsible for a whole team and the collective outcome of the team's work.

### **Keeping Video Skills Going – A Suggestion**

To conclude this talk I'd like to make a suggestion to everyone present today. As a community we need to work together to keep these skills and this knowledge going for as long as possible. While you may not get an opportunity to replay or capture these tapes yourself, you are setting the framework in which we are digitising our collections.



There is widespread interest and passion for television and mass media. Anecdotally, join any Facebook group about Australian television or movies and you will find a thriving community of people engaged in discussion about popular culture. Much of it quickly falls into comments that amount to “you couldn’t do that nowadays”. That said, the interest is there and it’s significant.

The BBC Archive’s Facebook page uses the organisation’s extensive film and video libraries to reach people all over the world, with the weird, wonderful and historically important material they hold.

The British Film Institute’s Missing Believed Wiped is a long-running and successful programme around finding then presenting previously missing television programmes.

There are many people writing terrific articles and blogs about Australia’s archival television. The NFSA has provided viewing copies for writers and researchers so they can write about television plays and series. The NFSA has also hosted many well-attended television events over the last decade.

We need to continue this and grow the appreciation of mass media beyond cine-film and now focus on electronic media, which was captured on magnetic tape. The NFSA’s previous publicity around this subject has brought additional attention, donations of tapes and equipment as a result.

We need to work together to create programs that will keep magnetic media skills and knowledge alive. These need to copy the successes of film preservation and projectionist courses, which are centered on a culture that places much store in cinema and its history. Who would have imagined a century ago that people would still want to watch old silent films? They still do and it’s enthusiasts who have created a culture and a successful model to find and encourage people to preserve this experience and the media itself.

Our culture industries, educational institutions, local community archives and our most important stakeholders - the public - stand to lose much of their commonwealth, if we don’t closely embrace and educate people in the value of our video holdings through digitisation.

While we may well digitise the bulk of our video collections (and as I’ve previously said, there will be a long tail of tapes yet to come in) we must simultaneously preserve knowledge of video systems and equipment in the process. We need to keep all the aspects of magnetic media preservation going long past 2025.

To do that, we need to invest in our people and help every organisation to make connections. There is so much to gain when we share, educate and collaborate together on this enormous task. This is something only people can do. There is no quick fix and it will start out small.

However, to quote former NSW Premier Jack Lang talking to a young Paul Keating, who went on to become Australian Treasurer and Prime Minister, -

“... people will tell you you have plenty of time but the truth is you haven’t a second to lose.” p.26 (2015) O’Brien.

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