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A Discussion of Audiovisual Archival Methods: Conversations with Institutions, Content Creators, Archival System Designers and Integrators

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My survey of local, national, and international audiovisual archival methods highlighted the underlying cause of why archiving media for video has yet to be refined to an easily-compartmentalized process. Companies who acknowledge that archiving their media properly is a concern still see it as unglamorous and perhaps even unworthy of committing a significant-enough portion of their budgets toward a sufficient solution. Finding "a solution" begins to look like the life's work of an artist rather than a "Point A to Point B" procedure. In my discussions with various representatives of content creators, archival system integrators, and institutional archivists, I hoped to discover success stories. In the end, I was shown just how complex the archiving process is, and how this inscrutability makes it virtually impossible to answer the question, "How much does a proper archive cost?"

To do a comprehensive examination of all the audiovisual archiving tools and methods available would be a daunting undertaking. While talking to each of the experts, I encountered names of products and systems for the first time. In response, I have chosen to focus on a few institutions and their methods of audiovisual archiving. I also look at several commercial tools or archival methods which can be used. I spoke or corresponded with national and international representatives from institutions, facilities, system designers and integrators. I will also look briefly at the case of the BBC and its Digital Media Initiative. According to retired Library of Congress staffer Carl Fleischhauer, the Motion Picture, Broadcasting, and Recorded Sound Division at the Library of Congress uses the Australian product MAVIS, an acronym for Merged AudioVisual Information System, in concert with Library's main Integrated Library System, also known as ILS (personal communication, October 13, 2016). The second system I will investigate is the UK-based Square Box's CatDV system, a mature and full-featured option. The third

system is newer suite of products made by Boston's Axle Video. Axle takes a simple search-based approach to its front end, and its ease of use was noted by many of the users I spoke with. Along the way, I will discuss the audiovisual archiving of Hubbard Broadcasting, Inc., and the Minnesota History Center, as told by Glenn Griffin, Media Specialist and de facto corporate archivist at Hubbard Broadcasting in St. Paul, Minnesota. Part of his duties include spending a day each week at the History Center working on a joint HBI/MN-HC digitization project.

Other than cataloging software, to create a complete archiving solution, a repository of any kind requires specialized hardware. In some cases, this is a significant investment to function adequately as an archival system, making the products discussed here only components in a larger corporate or video/audio post production studio archiving system. This includes proper equipment for digitizing, ingesting and editing. Software is also required to record, convert, stream and play multimedia content. Additional software is often necessary for extracting metadata from digital documents. Of course, as digital media is a core of the conversation, large digital asset management storage systems are required. If the front-facing client interface is web-based, then a cloud storage solution may be necessary. The details of building this infrastructure include aspects of a larger program outside of the scope of this report. While not fully explored, it should be noted that these expenses are additional hurdles to investing in proper audiovisual archival.

Greg Chastain, known locally as "Dr. Panic", is a video engineer and veteran system builder in the Twin Cities with an impressive resume stretching back nearly thirty years. He succinctly sums up the problem when he describes the six stages of the evolution of audiovisual archiving: 1) Move your stuff to a hard drive. 2) Move your stuff to two hard drives, and perhaps begin using a Finder- or Explorer-level cataloging application. 3) One day when a hard drive

doesn't mount due to mechanical or some other failure, data is lost. 4) Invest in LTO (Linear Tape-Open), a magnetic tape backup system that is more stable and reliable with better long-term data survivability than mechanical disks. 5) Make two LTO backup copies, and store one off-site, and finally, 6) Invest in LTFS, which was adopted in 2010. LTFS is a form of LTO that has a metadata structure built in that includes a directory system that allows the tape to be mounted onto a desktop and accessed in the same manner as a hard drive. There is latency in data retrieval due to the lineal nature of the tape and the need to cue to position to retrieve data, but the LTFS system metadata allows the file structure on the tape to be accessed similarly to a hard disk (Chastain, G., personal communication, November 2, 2016). After a catastrophic data loss – one that may include a hefty fee to a data retrieval company – or the close call of nearly having a catastrophic data loss, people are forced to consider better archival methods and backup systems. This reluctance tends to be a factor of human nature and the willingness to let things stay the same until there is a problem to be solved. It often takes an expensive loss to spawn the realization that proper archival practices are cheaper in the long run.

Unless you are the Library of Congress with a Preservation Directorate and a mission statement to:

> assure long-term, uninterrupted access to the intellectual content of the Library's collections . . . directly through the provision of conservation, binding and repair, reformatting, materials testing, and staff and user education; and indirectly through coordinating and overseeing all Library-wide activities relating to the preservation and physical protection of Library material (Library of Congress, 2010, August 31b, para. 1).

I reached out to the Library of Congress and received responses from three different people. Including the previously mentioned Mr. Fleischhauer, I also received responses from both Unit Processing Heads, Caitlin Hunter, of the Recorded Sound Section, as well as Andrea Leigh, of

the Moving Image Section. It was from these messages I first learned that the Library of Congress had moved on from the MODS-based AV Prototype Project and adopted the Australian product, MAVIS.

A complete MAVIS system includes hardware and software, but like all modern systems, there's no one specific configuration (Feenyx Pty Limited, 2015a). MAVIS has separate modules for such tasks as generating metadata, managing digital assets, building catalogs, managing authorities, and the rest of the different facets of the process (Feenyx Pty Limited, 2015b). As with all the systems I investigated, MAVIS has front-facing search or browse features in MAVISWEB. The ability to access the database from more than just the ingest station is critical as access points are relevant. Some can be made public, but most require log-in credentials for security. (Feenyx Pty Limited, 2015c). The beauty of MAVIS is that the software itself is free, although support from Feenyx for three concurrent users costs $3,000 per user per year. Martina McGinn, of Feenyx Proprietary Limited in Canberra, Australia, supplied me with some of the basic costs of a MAVIS system. Other than support contracts, there could be licensing costs to Oracle for larger databases as MAVIS uses Oracle for its backend (McGinn, M., personal communication, November 21, 2016). Although the MAVIS software is a free download, the yearly support contract and the potential cost of additional Oracle licensing means MAVIS is not a revenue-neutral proposition.

Fleischhauer explained the MAVIS system integrates with the ILS, so "[t]he flow of content data moves through these systems to the Library's digital storage systems, with appropriate metadata handoffs back and forth" (personal communication, October 13, 2016). Caitlin Hunter adds that having MARC cataloging as their base is an advantage to a workflow that includes copy cataloguing which lessens the workload for her unit. (personal

communication, December 9, 2016). Fleischhauer continues, explaining that when dealing with older material, the Library of Congress has "parallel 'content' systems that support the reformatting of older materials and the acquisition and ingestion of new, born-digital acquisitions" (personal communication, October 13, 2016). Libraries that live with old media next to born-digital media struggle to integrate them, which is a common issue for any facility that has been around for more than 12-15 years. Griffin warns that the future viability of tape is coming to a fast end, and that facilities that don't make a post haste effort to get that media off tape risk losing it. Griffin estimates that millions of hours of video have been lost already because it has deteriorated or used a tape format now obsolete and were not transferred in time (personal communication, November 28, 2016). Tape decks, their replacement parts, and the engineers who know how to keep them operational are vanishing.

The massive amount of material the Library of Congress already has on hand – which is expected to grow to 300 terabytes a day by 2020 (Rife, 2001, p. 4) and the continual flow of new physical and digital materials that come through its doors daily means the Library has a unique set of issues. According to Andrea Leigh, Moving Image Processing Unit Head, "The idea has always been that all of our collection will be in MAVIS. In reality, that is an ambitious goal due to the size of our collection overall" (personal communication, October 17, 2016). The sheer volume of the continually growing collection with which the Library of Congress must contend means getting every single item the Library either has or will have into MAVIS is a daunting task that may never be completed. Never completing the digitization of analog tape or ingestion of digital tape is a common thread among all respondents. Brian Thompson from Crash + Sue's, a production facility in Minneapolis, Minnesota, commented that since the tapes in their physical library are technically owned by their clients, unless each of the clients decide to fund a

project to get their media off tape, it's unlikely that the entire tape library will ever be fully digitized or ingested (personal communication, November 23, 2016). This is an additional facet to the archival problem. Clients own the tapes, but the tapes are in a facility's possession. There is an "out of sight, out of mind" aspect to the volume of their holdings that keeps clients unaware of the scope of their archival needs.

Michael Guncheon is an Editor, Compositor, and Partner at HDMG, another production facility in Minneapolis. After years of trying to discern what clients meant when they said they wanted to archive their media (among those who are willing to pay for it), Guncheon now asks, "What is it that you want to do with this media?" This gets the answers that help him make a good recommendation. It often becomes a question of saving everything or saving edited masters and b-roll. The answer depends on the client, their budgets, and their perceived future needs. (Guncheon, M., personal communication, November 30, 2016). Phil Seibel is the Digital Media Manager at Aldis Systems, also in Minneapolis, a company specializing in building asset management systems for large corporate clients. He concurs, saying that it takes a long time to capture what's in the client's head as to what they want their system to look like and build that in into their system (personal communication, December 13, 2016). He makes good use of the Socratic method when helping his clients decide how to move forward with designing their systems. He begins by asking, "How do you do it now?" and tries to help the client understand how discussing specific shots with a video editor is using the same data points as searching a catalog or database. He's trying to get the information out of the editor's head and into the asset management system (personal communication, December 13, 2016). These tasks are not achieved in short order. It takes answers to lots of questions, time and patience. These are things not all clients have in abundance.

After speaking with Thompson, Guncheon, Seibel, and the rest of my sources, it's quite clear that commercial post-production facilities and corporate video production departments have very different needs than the Library of Congress. However, the basic structure of a digital video archive remains the same. Seibel suggests that due to its nature as a general repository, the Library of Congress requires a "broad brush" for its purposes, and doesn't require certain considerations that corporate clients do. While in corporate asset management, more specific needs must be considered which are wholly dependent on each client. He likened the difference to the broadness of a search-engine search versus a targeted subject heading or authority file search (Seibel, P., personal communication, December 13, 2016), which is interesting in how it's reversed when it comes to the Library of Congress' own audiovisual archiving system serving its client base. It can be more broad, like a Google search, instead of narrow and targeted like its own subject headings.

Many institutions forgo a proprietary or turnkey archival system and rely on software such as Microsoft's Excel and general IT or IS department backup schemes instead of a true archival solution. Griffin describes his organizational method and workflow at Hubbard (HBI) as dependent on the job at hand. As a radio and television broadcast engineer trained by the United States Navy, and working within the Armed Forces Radio and Television Service (AFRTS), his highest priority is, "Retaining its original quality and able to read or reproduce it without adding additional or new attributes" (personal communication, November 10, 2016). However, Griffin reiterated that they do not use any commercial system beyond an Excel spreadsheet and organized filing structure on the media server at HBI. The overview structure of the HBI archives is in mostly Griffin's head. The archives consist of artifacts, film, video and 50,000 to 60,000 photographs. "Some", Griffin admits, "have never seen the light of day" since they were

put into the 9-drawer gunmetal gray filing cabinet that resides in his office (personal communication, November 7, 2016). His system needs re-cataloging and a proper tracking method, but Griffin cites the adage "Good, Fast, Cheap: Pick Two". In archives and in video production, this seems to be a theme that permeates. When there's no money, one treks along slowly using the tools on hand and doing the best with what is available. It's not efficient, but given time and proper attention to detail, it can be successful and cost-effective. Guncheon discussed the lack of proper archival within his own facility with a bit of frustration that is commonly felt by media archivists and facility owners (personal communication, November 30, 2016). The unwillingness of many clients to pay to "save their stuff" was a common complaint from several experts. Many facilities, studios and editors, myself included, feel responsible for it – not legally responsible, perhaps, but ethically. We know that giving media back to the client is rarely the best course of action. But keeping it is a burden that the client is generally unwilling to pay for largely because they can't envision the future use. We need to get better at advocating for leveraging these assets in the future and explain to our clients the reasons for maintaining proper archives. Thompson echoed a similar lament for Crash + Sue's, saying, "People love to save everything, but no one wants to pay for it" (personal communication, November 23, 2016). Making smart decisions on how to spend what budgets they do have available is the key. And like any archivists, they all understand that it's impossible to save every scrap, so they make judicious choices.

Greg Chastain recognizes Ron Schara Productions in Eden Prairie, Minnesota, as one of the biggest "power users" of CatDV he knows locally. Media Manager, Editor, and Videographer, Kyle Heidenreich utilizes a workflow that includes transcription of dialogue and tagging footage heavily before the editors start working (personal communication. November 23,

2016). This is a media librarian's and archivist's dream: to have proxies generated and media organized even before the edit has begun. Heidenreich explains Ron Schara Productions has used CatDV for five or six years, but his own experience has only been within the past three years. He says that he has done his due diligence and has looked other systems and other vendors, including the solutions from Axle Video, but he has chosen to stick with CatDV for two reasons. First is because it's what he knows and it's what he's comfortable with. "I can find and restore media from 20 years ago within minutes" (Heidenreich, K., personal communication, November 28, 2016). Second is "Our catalogs run deep and switching over would be very labor intensive recreating our structure" (personal communication, November 28, 2016). Heidenreich discussed migration in terms of when a specific piece of discontinued hardware eventually ceases to function. The replacement has already been chosen, but when the money will be spent depends on how long the existing piece of gear lasts. He estimates his migration is on a five-year plan, but it's currently dependent on the longevity of that device. One suspects that with the speed at which technology changes, it's possible that if they get 5 more years out of that device they may change their migration course anyway. New technology brings new options.

The most concerning issue for archivists in dealing with commercial products is the tendency for vendors to create closed systems and use proprietary forms of code and codecs that make migrating data more difficult in the future. The explosion of XML has opened many of those doors, and data harvesting is much more prevalent. The number of XML-based file translation companies in just the video editing sphere is testament to this growth. Video editors can get files in and out of a variety of software using XML interchange products. The fear of having data isolated into proprietary forms decreases with each passing year. Unsnarling data out from a decade and a half of one system to migrate to a new system will likely not come without

bumps, bruises, and frustrations, and like Heidenreich, many people may not take switching vendors lightly. Though vendors I had the opportunity to discuss this with nodded seemingly in agreement when I discussed this concern, none were willing to put their plans for migration simplicity or data harvesting out into the open quite yet.

CatDV is a mature product that has been around for nearly two decades. I have heard about it from clients since I began my business seventeen years ago. Like MAVIS, CatDV has many modules. CatDV is difficult to describe simply, "We like to think CatDV has a unique mix of flexibility, power, simplicity and cost. As a result, there's no such thing as a typical deployment" (Square Box Systems, n.d., para. 1). CatDV is deep, thorough, and complex. Chastain, who works with Digital Pictures, a value-added reseller (VAR) in Minneapolis, emphasizes that any archival system, but CatDV in particular, is not a "set it and forget it kind of thing" (personal communication, November 23, 2016). Both Chastain and Phil Seibel strongly encourage clients to formulate a plan before getting started with an archiving or digital asset management solution. With CatDV, clients need someone on board who knows CatDV to set it up and teach how to use it properly. Chastain does not like selling systems that don't include up to 80 hours of his time to help his clients get out of the starting blocks. He punctuates his thoughts with, "It's an investment" (personal communication, November 23, 2016). Seibel contends that it's more important to sell themselves as a service, not to sell software. Seibel called out CatDV's strengths as inexpensive and flexible, and its weakness is that it is so flexible that you can get lost in the shuffle" (personal communication, December 13, 2016). Seibel was the only person I spoke with who called CatDV "inexpensive", while other users referred to its expense compared to Axle Video's solutions as a drawback. When I followed up for clarification, Seibel confirmed that this was an apples-and-oranges comparison. Seibel estimated

that an installation of a broadcast solution can start at $250,000 for a facility. “CatDV, comparatively, starts in a range of a $20-$100K price tag for a system that can DO nearly everything that the big guys can, you just have to work harder to build it (personal communication, December 22, 2016). He praises CatDV for attempting to fill all niches with flexibility, but acknowledges that with flexibility comes complexity, and that’s part of what makes CatDV daunting for his clients. He suggests the weakness is people don’t understand there is so much required to get set up properly. They think CatDV’s rich features “are accessible straight out-of-the-box. Nobody understands that they have to sit down and work through all of the possible outcomes, user profiles, and workflows” (Seibel, P., personal communication, December 13, 2016). Seibel suggests CatDV’s main strength is also what causes many clients to purchase a license and then abandon the product. They don’t take the time or can’t make the time to get up to speed, so they never fully implement the system, if at all. Chastain concurs (personal communication, November 23, 2016).

Axle Video is the third system explored for this report. The cost of entry for Axle is far below that of both MAVIS and CatDV, and for those who have chosen it or are currently considering it, that is the major factor. The tradeoff in complexity seems to be an additional selling point for some. When asked why they chose the Axle solution, Brian Thompson replied with a list of reasons, including external web access, streaming and transcoding, and other technology requirements that fit their needs. “Axle had an attractive solution… we did not need as robust of workflow” (personal communication, November 23, 2016). What he likes about Axle is the simplicity that “lets us push videos from here to the internet so clients can see their footage” (personal communication, November 23, 2016). He called it a middle zone between a stock footage site and digital asset management system that allows them to “let clients see their

stuff" (personal communication, November 23, 2016). The simplicity of a "Finder- or Google-type search that didn't overwhelm users with thousands of options when they log in was very attractive" (personal communication, November 23, 2016). Michael Guncheon expects to be installing an Axle system at HDMG within the next 18 months. The cost differential was his main consideration as well. In his initial exploration, a CatDV system would cost more than $10,000 to implement, but would still have more functionality than he probably would ever use. An Axle system with fewer features than the CatDV system yet gave him everything that he suspected he needed would cost about $2,000. The lower cost of entry for Axle, which can be as low as $500 for a single-user license, is very attractive for both individuals when discussing selling asset management to their clients. Phil Seibel was the voice of opposition for Axle. He said he put several clients in front of both Axle and CatDV and in his experience, clients typically talk themselves into a CatDV solution because Axle doesn't have the depth his clients need (Seibel, P., personal communication, December 13, 2016). Both Thompson and Guncheon discussed using Axle Video as part of becoming a service bureau for online master and b-roll access for some of their clients. They independently agreed that the simplicity of working and maintaining the system and the lower cost would make Axle easier for their clients to consider than previous attempts to get their clients' media organized. (Thompson, B., personal communication, November 23, 2016. Guncheon, M., personal communication, November 30, 2016). Seibel echoed some of these same sentiments, though in his case he was not focusing on Axle Video solutions. His clients run the gamut of needs for their repositories. Some only want "retouched images", others want "everything and the kitchen sink", and then there are those that are mostly interested in their "masters and a b-roll archive" (personal communication, December 16, 2016).

All archive projects at any level require planning and resources. Though even with the best of intentions, resources aren't used to their capacity, or the planning ultimately falls short. Glenn Griffin commented that prior to teaming up with Hubbard for the joint digitization project, The Minnesota History Center didn't have any experience archiving film and video collections, save for a project with the former Minneapolis Public Library. When they first entered their discussions about the joint project, Griffin says the History Center didn't have the background to digitize film, and sent it out. They did have video digitization equipment, but Griffin didn't believe there was anyone remaining on staff who knew how to use it properly. He suspects it's easier to teach an engineer some basic metadata and archival skills than it is to teach a librarian engineering and technical skills, saying, "Most librarians I've run into don't know the difference in the technologies" (Griffin, G., personal communication, November 28, 2016). The digitization equipment at the History Center is now outdated and still sits unused. The digitization for the joint project is currently happening in the Hubbard building on University Avenue in St. Paul. Griffin has a single person on staff with a two-year grant to digitize four thousand 3/4" U-Matic tapes, dating from approximately 1976 to 1983, the main era of the format. One Hubbard program continued using the format until the 1990's. Even so, Griffin calls this "applying Band-Aids. Digitization requires a long-term plan." (personal communication, November 28, 2016). Currently they digitize between ten to twelve tapes per day. He keeps a copy in the Hubbard system, and provides a copy to the History Center. After the grant has elapsed, Griffin is unsure what will happen to the project. Griffin is also unsure what will happen when the chairman and chief executive officer of Hubbard Broadcasting & the joint digitization project's benefactor, Stanley S. Hubbard, passes away.

Even at one of the world's most renowned media producers, media asset management is truly a hurdle. It's possible to make a huge investment in an ecosystem and overlook something as simple as who is going to pay to fill the system with data, such as the BBC did with their Digital Media Initiative. The BBC spent the better part of a decade attempting to design a self-contained system that was far larger than just a digital asset system and archive. That became their ill-fated Digital Media Initiative, or DMI. Originally conceptualized in 2006, launched in 2008, and cancelled in 2013 with a cost of £1 million and nearly nothing to show for it, the saga of the DMI is too detailed to add to this report. However, the result was that even a large organization that is publicly funded such as the BBC, when put to the task of designing an archival system, stutters and stumbles and in this case, eventually fails (National Audit Office, 2014). Guncheon remarked that in his career, he's "yet to see an asset management system that works" (personal communication, November 30, 2016). Seibel suggests that sometimes "it pays to get to a frustration point to see how [the client] wants it solved" (personal communication, December 13, 2016). Though sometimes his clients confound the situation by being angry with the system they have, but want to reproduce it because that's with which they are familiar. They seem to want the old system to work better. They aren't interested in understanding a new system. This is the hurdle he finds himself facing. Clients make a purchase, and they want to "switch it on and use it the way they want to use it without it taking a month to figure out how to get it to do what they want it to" (Seibel, P., personal communication, December 13, 2016).

The state of long term audiovisual archiving could benefit from more cooperative interaction between librarians and archivists, video editors and producers, and software and hardware engineers. Librarians and archivists look at audiovisual material much differently than film & video editors and producers, who look at it much differently than engineers and

manufacturers of systems. Although their endgames are virtually identical – to have this material easily accessible for future use – their approaches are seemingly different. To top it off, engineers, who often have no practical knowledge of how this material will ultimately need to be accessed in the future, are designing the tools. Griffin proposes, "One wants it done, another wants it done cheaply, another wants it done right but then money is the devising force …They [all] compete by means of money motivations and purposes." (personal communication, November 10, 2016). Seibel characterizes it as the manufacturers not having the capability to "think outside to how people are going to want to look at these things in a different channel", citing examples in the video world of how a producer would need to send information to a video editor, and then that editor would need to send information to a colorist (personal communication, December 13, 2016). Seibel expands on these thoughts, saying that "companies are trying to be simple and not taking into account the actual users" (personal communication, December 13, 2016). There are many reasons the state of institutional, corporate, and facility archival all seem to be in flux. With all the frustrations, largely related to evaporating budgets, little understanding of the complexity of the nature of audiovisual archiving, and lack to time to properly execute archival projects, the enthusiasm my interviewees all expressed for what they do was palpable. Virtually every person interviewed expressed "I do this because I love it" in some fashion. However, passion cannot overcome the real-world constraints of time, stewardship, and money required to be create a functional, accessible audiovisual archive that has the capacity to migrate into the future as technology progresses.

Griffin seemed to put a fine point on it: it comes down to budgets and who has them (personal communication, November 28, 2016).

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