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CALL FOR PRESENTATIONS IASA 2019

50th Annual Conference of the International Association of Sound and Audiovisual Archives (IASA), in Hilversum, Netherlands.

30 September – 3 October 2019

Imagine the Future!

The programme committee for the IASA 2019 conference welcomes proposals representing a broad palette of archival and personal interests which are distinguished by their focus on sound and audiovisual documents. Particular subject areas might include musical recordings; historic, literary, folkloric, and ethnological sound documents; theatre productions; oral history interviews; news and broadcast materials; bio-acoustics; environmental and medical sounds; linguistic and dialect recordings; as well as recordings for forensic purposes. This year, IASA encourages presenters to envision the future of audiovisual content and to address concerns of interest for those who create, use, manage, and preserve such material.

The International Association of Sound and Audiovisual Archives (IASA) was founded in Amsterdam in 1969 to function as a medium for international co-operation between archives that preserve recorded sound and audiovisual documents. In 2019, we gather to celebrate our past 50 years and to craft our future. Proposals for papers, plenaries, or workshops that reflect IASA's history or future are welcome.

The programme will include papers, posters, tutorials, and practical workshops (3 October).

Following IASA's 50th Anniversary Conference will be the Joint Technical Symposium (JTS) in Hilversum, Netherlands. IASA and JTS will share an exciting collaborative day of workshops on October 3, 2019.

The call for presentations is now open. Please submit your proposal by using the online submission form at: http://2019.iasa-web.org/call-presentations

***** The deadline for submissions is 24 February 2019 *****

Note: Accommodation, traveling, and subsistence costs are the responsibility of the presenters. Presenters are required to register prior to the 'Early Bird' registration date to remain on the programme. All other attendees are required to register and pay the registration fee in advance of the first conference day. IASA members may apply for a IASA Travel Award to assist with their travel costs.

Visit the IASA 2019 conference website for details and regular updates:
http://2019.iasa-web.org/

– Toby Seay, IASA president

International Association of Sound and Audiovisual Archives
Internationale Vereinigung der Schall- und audiovisuellen Archive
Association Internationale d'Archives Sonores et Audiovisuelles
Asociación Internacional de Archivos Sonoros y Audiovisuales

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IASA JOURNAL EDITORIAL BOARD

In order to ensure diverse and clearly-articulated viewpoints in each issue of the journal, the IASA Journal solicits input and guidance from an Editorial Board consisting of the current IASA Editor and President as well as an invited group of IASA member representatives from each continental region throughout the world.

The IASA Journal Editorial Board provides general review and guidance on direction of the IASA Journal, meets once yearly during the IASA annual conference, assesses previous year's journal issues and makes general suggestions for future activities.

Board positions are entirely voluntary and receive no remuneration or financial support from IASA.

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It has been a tremendously busy operational year for the IASA Journal and other IASA publications, hence the delay in delivering issue 49. First and foremost, *IASA-TC 06 Guidelines for the Preservation of Video Recordings* made its draft debut after a long editorial push over its 300+ total pages. Carl Fleischhauer contributes a short announcement in this issue of the journal to demark TC 06's release. Secondly, with tremendous support from Lindsay Mattock, new IASA Journal Editorial Board member for North America, I completed a proposal to the IASA Executive Board to receive approval to move the journal to an open access model (see below for more details). Finally, a new cohort of editorial board members has been named to replace a previous cohort whose terms had completed. I want to thank Kate Murray, Grace Koch, Shubha Chaudhuri, and Zane Grosa for their time and support as members of the editorial board. And, I am happy to welcome new members Lindsay Mattock, Irfan Zuberi, Eleonore Alquier, and Claude Mussou to the editorial board. I look forward to learning from you and welcome your vision as we continue to grow and improve our shared vehicle for professional and intellectual knowledge.

In this issue, five articles address an equally diverse slate of topics that are all of importance to global audiovisual archives communities. Reto Kromer gives us a first-person account of the opportunities and pitfalls that data migrations provide, recognizing the difficulty of the process while recommending opportune improvements. Edward A. Benoit looks closely at the opportunities of user-generated description for time-based media content. Literally joining forces, Brecht Declercq and Irfan Zuberi discuss their respective successes in Belgium and India to develop mature and successful audiovisual digitization, digital preservation, and access programs. Notably, Zuberi gives an overview of the first organization ever to receive an ISO 16363 certification as a trustworthy digital repository. Elizabeth Surles looks closely at the use of *Describing Archives: A Content Standard* and its applicability within sound and audiovisual collections. Surles research engages longstanding discussions around the best practices of cataloging and describing complex content found in time-based media collections. Finally, Sami Meddeb and Louis Fortin team up for a brief musing on the importance of harnessing the power of the Internet to improve access to soundtracks.

Although I hope you are excited to move on to the content of this issue, I do hope you take a minute to read what follows.

As the *IASA Journal* prepares for its move to be an open-access journal, I would like to publish the text of the justification that was presented to the Executive Board in Accra, Ghana in October 2018 for approval (which was given unanimously by the Executive Board) and was subsequently presented to the membership during the General Assembly in Accra, Ghana in October 2018.

IASA Journal Online Open Access Justification

The *IASA Journal* Editor proposes that the Executive Board approve the transition of the *Journal* to a hybrid paper/digital open access format where articles are released immediately to the public through the IASA Journal OJS platform while also compiled and printed for members as issues are completed. This proposed change will:

- Provide broader, free immediate access to the journal content ensuring equitable access to the research published in the *Journal.*
- Encourage more publications to the Journal by colleagues who will not publish in IASA because it is distributed only to members/subscribers and is not available as Open Access.

- Move the *Journal* to a digital platform that will streamline the process of peer-review and publication and automatically generate metadata necessary for indexing the publication.
- Continue to support the needs of members and authors who require a printed paper copy of the Journal
- Begin to reduce the costs associated with the publication of the *Journal,* releasing monies to fund the indexing of the *Journal* across scholarly databases to increase journal readership.
- Provide flexibility to the editor, reviewers, and authors now that peer-review is in full effect, allowing completed and approved papers to be released digitally when more labor-intensive reviews cause delays for full Issues to be completed.
- Bring the IASA Journal on par with IASA's treatment of Technical Publications which are provided in digital form for free to the entire world as soon as they are published.

Open Access Models

The "open access" as defined by the Budapest Open Access Initiative[1] includes peer-reviewed research that is:

- published on the public internet
- available for users to read, download, copy, distribute, print, search, or link to full-text of the articles, without cost
- indexed with metadata that may also be crawled, shared, or used as data
- and only constrained by the confines of copyright, which is maintained by the authors of the published work

The Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities[2] similarly defines open access as "free, irrevocable, worldwide, right of access to, and license to copy, use, distribute, transmit, and display," work with proper attribution to the authors. Both the Budapest Initiative and Berlin Declaration define the broadest level of access to ensure the free and open dissemination of knowledge.

Many journals within the archival field are available as open access. There are three different models: open access with a fee, open access with embargo, and true open access.[3] *Archival Science* has opted for the most restrictive of these models. Published by Springer, *Archival Science* allows authors to individually opt-in to open access publication of their contributions. There is currently a total of 10 articles (of 398) available as open access. Springer states that articles published as open access in this hybrid model are accessed and cited at rate higher than those that are not. However, authors are charged a $300 fee per article to publish their articles as open access.

1 Budapest Open Access Initiative, available at https://www.budapestopenaccessinitiative.org/boai-10-recommendations. Accessed 2018-11-25.

2 The Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities, available at https://openaccess.mpg.de/Berlin-Declaration. Accessed 2018-11-25.

3 For additional discussion of open access models, see Paul Conway and William E. Landis, "Open-Access Publishing and the Transformation of the *American Archivist* Online," *American Archivist* 74 (Fall/Winter 2011): 482-505, published following the SAA's decision to open access to back-issues of the journal.

Journals such as *The American Archivist* and *Archivaria*, published by similar professional organizations opted for the second model, making the back-issues of the journal openly available to non-members. An embargo has been placed on the three most recent years of the publication, which are accessible only to members of the professional organizations. The abstracts and table of contents are open, but the peer-reviewed content is restricted to members of the respective organizations. Articles become open access once the embargo has passed and authors are not charged a fee. While this model does open the majority of journal content, the most recent scholarship remains inaccessible to non-members.

Journals such as *First Monday, Code{4}Lib*, and *Ariadne* have *fully embraced the open access model, providing free and open access to all articles immediately*. In this model authors are encouraged to select an Creative Commons license for their articles and the articles are immediately openly available on the web. ***This is the model that the editor recommends for IASA Journal.*** Serving a global audience, this will ensure that the excellent scholarship published in the journal will be accessible to all archivists in the field, matching the policy for the Special and Technical Publications.

Increasing Participation

Many institutions are encouraging scholars to publish their work in open access journals and readers are increasingly expecting open access to materials. The Association for College and Research Libraries (ACRL) adopted an open access policy in June 2016[4] encouraging all librarians to make their research openly available by either publishing in open access journals, opting-in to open access when available through publishers or depositing their work in a local institutional repository. *IASA Journal* has an opportunity to embrace a similar open policy and contribute to the growing body of open scholarship. *IASA* would be the first of the professional associations for audiovisual archivists to adopt an open access model - both AMIA's *Moving Image* and *ARSC Journal* are restricted to members - and the first of the archives journals to be truly open access. Removing these barriers to access will not only provide venue for scholars seeking to publish in open access journals, but also has the potential to increase the readership for the journal. As an example, a 2008 study of journals published by the American Psychological Society found that open access articles had 89% more downloads and 23% more unique visitors.[5]

Author Rights

Open access does not mean that authors give up their Copyright over their work. Authors grant a limited license to the journal to publish their material and should be encouraged to adopt a less-restrictive Creative Commons License for their work. The Budapest Open Access Initiative suggests a Creative Commons Attribution (CC-BY) license that allows for unrestricted use of published works as long as the work is properly attributed to the author. *First Monday*[6] allows contributing authors to select a Creative Commons license of their choice or publish completely within the public domain and can serve as a model for *IASA Journal*.

4 Available at http://www.ala.org/acrl/standards/openaccess. Accessed 2018-11-25.
5 Davis Philip M, Lewenstein Bruce V, Simon Daniel H, Booth James G, Connolly Mathew J L. Open access publishing, article downloads, and citations: randomised controlled trial BMJ 2008; 337 :a568. Accessed 2018-11-25 at https://www.bmj.com/content/337/bmj.a568.
6 Available at https://firstmonday.org/ojs/index.php/fm/about/submissions#onlineSubmissions. Accessed 2018-11-25.

Open Journal Systems Platform

The final requirement for open access is the generation of harvestable metadata. In order to meet this requirement, the *IASA Journal* must consider a publication management platform. The *IASA Journal is* currently testing the Open Journal Systems platform. This open-source software is designed to host open access journals and supports the entire publication cycle. OJS is fully customizable and can be easily integrated into the IASA website, maintaining the organization's branding. The platform is automatically indexed by Google Scholar and produces metadata that can also be shared with and harvested by other indexing services, allowing the *Journal* to be discoverable by a wider audience. Other open access journals like *First Monday* use OJS to manage and publish open access research.

Cost

A digital open-access model will ***reduce*** the cost of publication for the *IASA Journal.* The OJS platform is freely available and the cost of hosting is minimal. The *Journal* is already produced in a .pdf format and can continue to be made available in this format. As of 10-2017, Ninety-six IASA members elected to receive the journal in electronic format only. In the initial phase of this proposal, those preferring to read a hard-copy will continue to receive a printed copy once an entire Issue is complete. Additionally, the back issues of *IASA Journal* have already been digitized and can easily be integrated into the OJS system, representing a minimal effort by the editorial team as the project moves forward. The largest cost associated with the publication will be the indexing services, which are estimated to be approximately $500 per year (for DOI support using CrossRef services, and for membership with DOAJ (Directory of Open Access Journals). If approved, the Editor will begin coordinating the logistics for these two indexing requirements.

I look forward to hearing your thoughts on the contents of this Issue, as well as on the future of the IASA Journal.

Bertram Lyons, CA
IASA Editor

A LETTER FROM IASA'S PRESIDENT

Toby Seay, Drexel University, USA

The 49th IASA Conference took place in Accra, Ghana from 1 to 4 October 2018 under the theme *Access and Accessibility – Archival Policies and Barriers in the Age of Global Information Exchange*. This gathering truly embodied the notion of global information exchange as it was attended by delegates from 29 countries. From the Opening Ceremonies to the Closing Banquet, delegates were treated to engaging cultural events, professional site visits, educational workshops and tutorials, and an incredibly diverse program of spoken papers from wide ranging perspectives and situations. The Executive Board is grateful for the hard work that Judith Opoku-Boateng and her team at the Institute of African Studies did in being such welcoming and graceful hosts.

I want to personally thank the Executive Board for their hard work. Led by VP of Conference Logistics, Zane Grosa and VP of Conference Programming, Pio Pellizzari, every member of the Executive Board spent the conference in a full-speed sprint to ensure a successful event. Much of what the Executive Board does is invisible to membership. But I assure you that each conference requires more than a year's worth of work that is performed diligently by your elected representation. I am grateful for their hard work.

Now we start planning for next year. On 30 September – 3 October 2019, IASA will hold its 50th Anniversary Conference in Amsterdam, Netherlands. We will hold this conference in conjunction with CCAAA's Joint Technical Symposium, which will be held on 3 – 5 October. With such a significant milestone in the Association's history, we will be celebrating the past 50 years of leadership in sound and audiovisual preservation. However, it is a great opportunity to look forward and imagine the future. If you will indulge me, I would like to describe the future that I imagine.

As I mentioned before, the 49th Conference in Accra was a gathering of a diverse range of people. It was, in my opinion, one of the most heavily representative conferences from the perspective of the researcher. We in the archival field are deeply concerned with the handling, treatment, and processing of our materials, which will always constitute a large portion of our Association's initiatives. Our training endeavors and our technical documents serve the sound and audiovisual community with the standards and best practices needed in the profession. However, these standards and best practices contain greater meaning when viewed through the optics of both the material's creators and users.

IASA has always served the professional archival and library community, audiovisual industry, academia, and the private collector. And, historically, IASA has done very well in creating an inclusive community. But with our eyes and ears on preserving the world's cultural heritage through sound and audiovisual materials, IASA is poised to be the standard bearer for cultural heritage preservation for all who have stories to tell and those who need their stories saved.

Therefore, I imagine IASA's future to be an association centered on inclusion to the benefit of what UNESCO calls "knowledge societies." The four principles that UNESCO established to describe an equitable knowledge society are cultural diversity, equitable access to education, universal access to information, and freedom of expression.[1] Using these principles as guides, I see IASA as a diverse and inclusive association within these domains:

1 United Nations Educational, Scientific and Cultural Organization (2005). Toward knowledge societies. *UNESCO World Report*. Conde-sur-Noireau, France: Imprimerie Corlet.

- Diverse fields – Instead of creating an exhaustive list of disciplines, IASA is the association for all who create, use, manage, and preserve sound and audiovisual documents. This includes the care of historical documents and the care of new documents at their creation.
- Diverse membership – IASA is the home to institutions and individuals of creators, users, managers, and preservationists of all nationalities and cultural origins. Fostering translations of our publications and leveraging the Ambassador Programme to provide outreach and communication are just two ways we can reach and serve all communities.
- Inclusive access – IASA will be a safe and respectful association that welcomes all people regardless of age, race, colour, gender identity, sexual preference, religious belief or lack thereof, political persuasion, or national origin.[2] While this is stated in our Code of Conduct, it is important to state and keep this foremost in our agenda.
- Inclusive dialog – All members and conference delegates have a voice in IASA. Participation shall always be open, respectful, and honest. This dialog must be two-way. IASA instructs the community and IASA learns from the community.

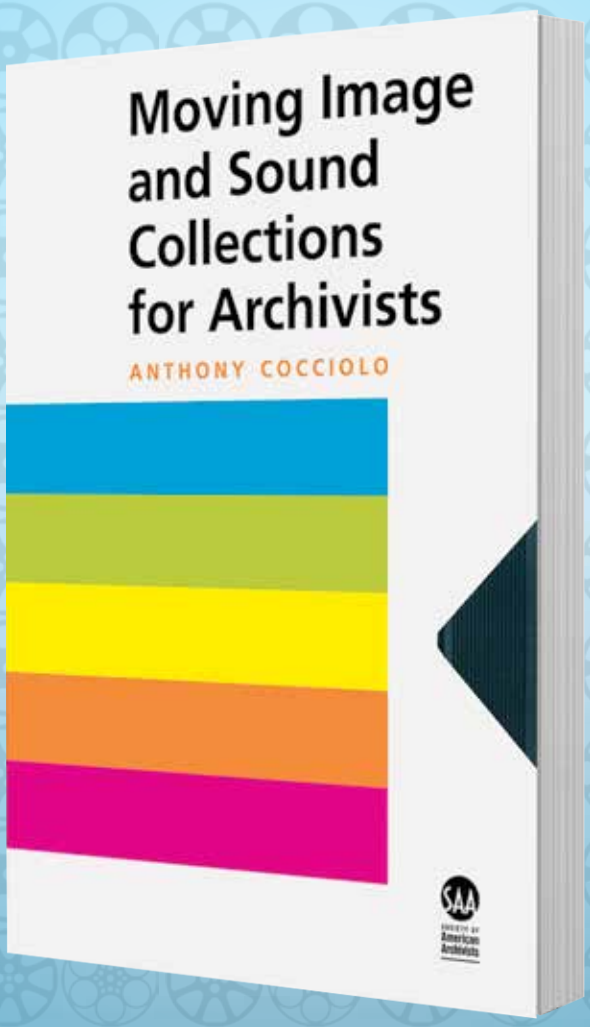
It is in this spirit that I invite you to celebrate our 50th Anniversary Conference in Amsterdam. It is also in this spirit that I invite you to get involved with all aspects of IASA year-round. Our success as an association depends on your voice and participation.

Imagine the future.

Toby Seay
IASA President
November 2018

2 See https://www.iasa-web.org/code-conduct to review the current IASA Code of Conduct.

Any Way You Splice It, Make Archiving Easier.



"Written for those who find themselves frustrated by pesky audio-visual recordings that are found in mixed collections, this book is impressively comprehensive, covering everything from accessioning to access, with media-specific guidance. It's essential reading for seasoned professionals and students alike."

—Kara Van Malssen, Partner and Senior Consultant, AVPreserve

Society of American Archivists (2017)
7x10 | 224pp | soft cover
$69.99 (SAA Members $49.99)

SAA Society of American Archivists

Browse and buy books at *archivists.org/bookstore*

Claes Cnattingius

Claes Cnattingius, honorary member of IASA, died in Stockholm on March 6, 2018.

Claes in the center with Ulf (l.) and Rolf in Swedish Woods.

Claes was one of the archivists who established IASA in 1969 in Amsterdam. He joined the first Executive Board as Treasurer under the leadership of Donald Leavitt and held that function when in 1972 Timothy Eckersley became President. It was amongst others thanks to his work that the young Association grew steadily. In 1975 Claes left the Executive Board but that was not the end of his services to IASA.

In that first period of IASA it was also in particular thanks to him that the cooperation with the International Association of Music Libraries (IAML) went well to the benefit of both organizations. When in 1978 IAML and IASA established a Joint Committee on Music and Archives, Claes took the chair with Derek Lewis, Ulf Scharlau, Marie-France Calas, and Ann Briegleb as members. At the Annual Meetings the themes and discussions of the Joint Committee proved to be of particular interest, including in 1979 in Salzburg "Sound Recordings in Musicological Research", in Cambridge in 1980 "Access to Radio and Record Industry Libraries", in Budapest in 1981 "Bartók's Legacy: Documentation and Dissemination of Folk Music in Sound Archives" and finally in Arlington (1983) "Popular Music in Sound Archives: Criteria for Selection and Classification". With such themes Claes and his fellow members broke ground.

1984 was the end of Claes' functions in IASA, but not of his activities. In 1986 together with Swedish colleagues he organized the Annual Conference of IAML and IASA in Stockholm. Prior to his conference, he and his wife Katarina invited a few IASA friends and their spouses for a week in the middle of the Swedish woods — an unforgettable experience. Then, in 1989, at a small festive occasion at the Oxford Conference, Claes said farewell to his friends. We met him and Katarina for the last time at the Helsinki Conference in 1993 when they came over for a short visit. Since then we kept contact via telephone and Christmas cards.

Claes was a highly professional head of the Swedish Broadcasting Archives and at the same time a highly knowledgable musicologist and music historian. He was an interesting and gentle man with a wonderful sense of humor and esprit. Above all he was a dear friend. We ourselves and all of us in IASA have a lot to thank him for.

Rolf Schuursma
IASA President (1978-1981)

Ulf Scharlau
IASA President (1984-1987)

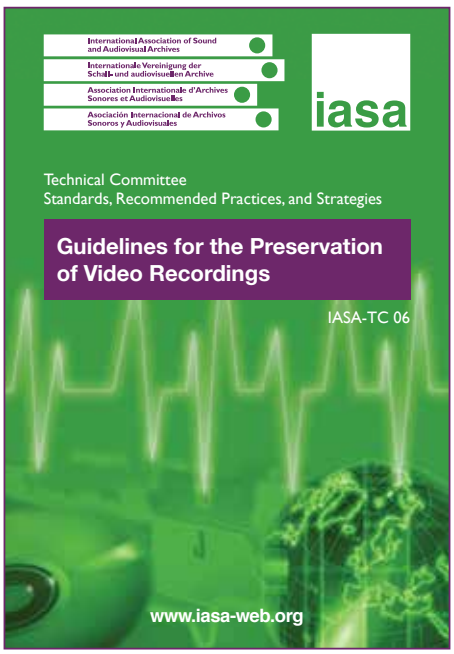
First edition of IASA-TC 06 online

Carl Fleischhauer

About the guideline. The IASA Technical Committee (TC) is pleased to announce the online publication of *Guidelines for the Preservation of Video Recordings, IASA-TC 06* (https://www.iasa-web.org/tc06/guidelines-preservation-video-recordings). As explained in history section below, the guideline is being published in phases and this *first edition* focuses on carrier-based recordings, i.e., videotapes (mostly analogue), with additional historical and contextualizing information. The publication is divided into five parts:

- **A.** Introduction
- **B.** Video Signal, Preservation Concepts, and Target Formats
- **C.** Video Carriers and Signal Extraction (Replay/Playback)
- **D.** Planning, Setup, and Workflows for Video Digitisation
- **E.** Bibliography

This edition is the work of a number of contributors: George Blood (George Blood LP, Philadelphia), John Bostwick (George Blood LP), Kevin Bradley (National Library of Australia), Charles Churchman (C.W. Churchman Television, Lafayette Hill, Pennsylvania), Carl Fleischhauer (Library of Congress, retired), Ross Garrett (National Film and Sound Archive of Australia), Lars Gaustad (National Library of Norway and Chair IASA TC), Dinah Handel (Stanford University), Andrew Martin (DAMsmart, Canberra), Andrew Pearson (British Library), James Snyder (Library of Congress), and Tom Sprague (Museum of Broadcast Technology, Woonsocket, Rhode Island). Fleischhauer and Bradley also served as general editors.



The carrier-based formats (or "format families") described in part C represent types frequently encountered in memory institution collections:

- Quadruplex 2-inch Videotapes
- EIAJ and Sony CV ½-inch Open Reel Videotapes
- 1-inch Helical-Scan Open Reel Videotapes (types A, B, C)
- U-matic ¾-inch Videocassettes
- ½-inch Analogue Consumer and Semi-Professional Videocassettes
- Betacam ½-inch Professional Videocassette Family

The 2018 online publication is also is tagged *first version*. As they reviewed the draft, the TC saw that the larger preservation community would be able to provide added information and help correct errors. Readers are invited to send comments and suggestions for improvements to the chair of the IASA TC: Lars Gaustad (lars.gaustad@nb.no). The plan for near-term revision motivated the decision to present the first version online, deferring a print edition pending community improvements.

History of the IASA-TC 06 project (thus far!). The project to draft the guideline was launched at the 2011 annual IASA conference in Frankfurt, in a special meeting convened by Kevin Bradley, then IASA's president and the editor of the predecessor *Guidelines on the Production and Preservation of Digital Audio Objects: IASA-TC 04*.

Initially, the project's volunteer editors and authors planned a comprehensive work that would address two categories of video: first, older, carrier-based (and mostly analogue) recordings and, second, more recent digital-file-based recordings. In addition, there was a desire to discuss metadata and to provide advice on shooting ethnographic, documentary, and oral history video footage in a manner that maximizes its "preserve-ability".

During the ensuing four years, however, only slight progress had been made. Special focused discussions were held at the 2015 annual IASA conference in Paris, including a session held at the La Vagalame restaurant at the Quai Francois Mauriac on the Seine. Although the setting contributed to high spirits, participants also commented on the project's slow progress. At the 2016 meeting in Washington DC, the TC saw that a comprehensive guideline could not be assembled within a reasonable timespan and, in response, they developed a plan for two-edition, phased project.

When drafted, the *second edition* will focus on the preservation of digital-file-based video formats with added information on the transfer of digitally encoded recordings in videotape form. The TC recognizes that archives are acquiring significant numbers of file-based video recordings and that their preservation is an ever-growing problem. We also hope to include sections that pertain to metadata and the production of new recordings (of the sort an archive itself might sponsor, like oral history interviews) in preservable formats.

Meanwhile, regarding the current first edition, the editors believe that the discussion of conventional carriers in part C will have permanent value. In contrast, some of the topics covered in parts B and D are volatile and proved especially challenging as this edition was drafted. The content of these parts is likely to be adjusted as time passes. Examples of volatile topics include the identification of digital target formats in part B; the problem of retaining the full video "payload" when digitising, in both parts B and D; and the matter of digitization facility design as "the industry" moves from serial interfaces to bitstream movement via IP networks, alluded to (but not "solved") in part D.

Discussion of IASA-TC 06 at the La Vagalame restaurant in 2015. Among the attendees are Kate Murray (left, back to camera), Bert Lyons (in profile), Kevin Bradley (standing, leading the discussion), George Blood (far end of table, looking at camera), Rebecca Feynberg (opposite Blood), and on the right side far-to-near: Hermann Lewetz (light jacket), Stefano Cavaglieri, Richard Wright, Lars Gaustad, Michel Merton (standing), Sebastian Gabler, and Tommy Sjoberg.

The TC hopes that *Guidelines for the Preservation of Video Recordings, IASA-TC* 06, will have high interest for a wide range of readers. We envision our archetypal reader as an archive administrator, technically sophisticated but not an engineer, who does some combination of managing a preservation-production operation (in-house activities) and selecting and managing preservation-service contractors (outsourced work).

Musings on the Importance of Harnessing the Power of the Internet to Improve Access to Soundtracks

Sami Meddeb, Tunisia
Louis Fortin, Les Productions Mission Vision, Canada

In the last century, information creation has exploded; more books, newspapers, magazines than ever before; radio shows, recorded music, movies, TV shows, continuous live news, user generated web content, 3D, virtual reality, games, hybrid media types mixing genres and recycling older data, and the list goes on and on. With the digital revolution, this phenomenon of information creation, mixing, recycling, and sharing is ever expanding. Because of the power of the Internet, it has never been so easy to create, save, and share information that will seemingly last forever.

The major engines that engender such proliferation of digital content on the Internet are the emerging digital technologies that thrive from: volume, variety, velocity, value, and veracity, all of which converge to generate big data.

This proliferation of information, created or digitized each day, must be subjected to security procedures to ensure its authenticity, integrity, and, more importantly, its accessibility as it flows into archives.[1]

The challenge to capture and describe, in a standard and efficient way, all relevant material in this sea of available digital information has never been so great. The multimedia nature of cinema and new media forms, which reuse older content, only adds to the complexity of the already daunting task. For example, cross-referencing exhaustively the use of a historical musical piece in film and TV should be easy to do but the data is often unorganized or unavailable. The archivist or researcher finds themselves digging deep in user generated content databases such as IMDB, Wikipedia, and others[2] for information, or even in some commercial ventures such as Spotify.

Archiving venues could greatly benefit from harnessing the power of the web to better organize and to categorize this flow of data as other fields have done. In astronomy, for example, big data has also become a challenge. Astronomers now receive many more images from the cosmos than they can study. To address this onslaught of images, astronomers have shared these images with the world, and now a great community of enthusiasts of the stars has emerged to assist in the classification of stars/galaxies in the same way one might contribute to Wikipedia. This is a great example of the successes of crowdsourcing. Archiving venues can learn from these experiments. Inserting existing standards for classification, metadata, and cross-referencing[3], archives could then invite users to assist with ongoing description of the immense caches of digital content amassing in all corners of the archive. This collaborative and collective approach may be the only way we can address our growing collections in this age of constant live data creation.

1 Niederhäuser, Yves. (2017). L'archivage numérique des films et vidéos: fondements et orientations. http://memoriav.ch/wp-content/uploads/2017/09/Empfehlungen_Digitale-Archivierung_Version1.1_FR.pdf

2 For example, see the lists here in Wikipedia: https://en.wikipedia.org/w/index.php?title=Special:Search&search=movie+database&fulltext=1&profile=default&searchToken=d0pv35nimbfko7iph7n387tj4; and https://en.wikipedia.org/wiki/List_of_online_music_databases.

3 For example, see this resource regarding digital curation metadata standards : http://www.dcc.ac.uk/resources/briefing-papers/standards-watch-papers/using-metadata-standards. Additionally, see Lyons and Van Malssen's work on Bibframe metadata standards for audiovisual materials here : https://www.loc.gov/bibframe/docs/pdf/bf-avtechstudy-01-04-2016.pdf.

From the author's perspectives, soundtrack research remains specifically difficult due to the phenomenal growth and production of TV series and new films. In the case of a film such as *Guardians of the Galaxy, Vol. 2,* the soundtrack gives new life to music of the 70s, such as Blue Swede's "Hooked on a Feeling," and Aliotta Haynes Jeremiah's "Lake Shore Drive." Today, it is rare to know the all the music in a soundtrack unless it was created by a well-known composer, such as Hans Zimmer. The adoption of a metadata scheme that links songs and composers to soundtracks would save valuable time and make research faster and more relevant.

The adoption of five simple research criteria data elements could serve to aid the archivist's work, especially if crowdsourced help can be acquired: name of production company; date of publication; title of TV series or film; soundtrack listing (song titles, artists); soundtrack producer.

This work will require collaboration between archivists, computer scientists, and the public, while respecting national and international legal frameworks to preserve human history and the memory of the world. Thanks to the evolution of digital information, it will be possible, working smarter and in collaboration with the public, to preserve a tsunami of high definition audiovisual content.

On the Bright Side of Data Migrations

Reto Kromer, AV Preservation by reto.ch, Switzerland

Let's be very clear from the very beginning: I do not consider data migration a good thing at all for the archive community. On the contrary, it costs a lot of time, money, and effort to be achieved accurately. But it cannot be avoided. I will discuss here how data migrations can be used efficiently for modifying, where necessary, the archive's containers, codecs, data and metadata. During the two dozen of data migrations we have carried out for ourselves and our clients, we could actually fix errors in the structure and metadata of the archive, and also we could replace obsolete or endangered formats with current ones. This allows us to change or adjust the strategy when needed. We could update the data and therefore realise maintenance of the digital archive.

1. In the Jungle of File Formats

When I announced that I was going to present on the bright sides of data migration,[1] my colleagues replied to me that it will be a very short speech…five or ten seconds at best! And, indeed, data migration is mostly a bad thing, also because it can be imposed by vendors on archives (when archives have service contracts for software or hardware products) and it can cost a lot of time and money that archives often lack. Inaction is almost never a good choice in the digital domain. Often, it is better to choose an intermediate step, one that can be improved or modified later. Nevertheless, my presentations—and consequently this article—do focus on how a data migration can be used in a positive way, for example to modify where needed the archive's containers and codecs. And I do apologise that my text has a strong personal tone.

In 2002 I began teaching the conservation and restoration of moving images at the Bern University of Applied Sciences. Since that first lecture, every single year I am explaining to the students that in the digital domain it is essential to preserve not only the files, but also at least the source code of the codecs used to create those files. This remains good practice 16 years later, in my opinion. Of course, it is easier when that code is released as open source. Otherwise, it may be much more difficult or even impossible, because one would need to steal intellectual property and/or to reverse engineer to find the applied algorithm. It is completely feasible to crack the code, as it has been done for example for all the ProRes 422 and 4444 variants, but again it costs time and money to the archive. In my opinion, this is indeed a very important point: we as an archival community do need to know in every single detail the file formats we are supposed to preserve. Not each digital archivist needs to be a technical expert, but at least one person in each team should be highly skilled.

1.1 HuffYUV and FFV1

When I left my position as head of preservation at the Cinémathèque suisse in 2003, I established my own conservation and restoration company, AV Preservation by reto.ch, opening both a full photochemical lab and a full digital lab. As at that time no scanner was available so as to be able to gently handle fragile archival material, my team and I often had to build our own equipment, for example by modifying a Truca-like film printer, and sometimes by manufacturing from scratch the machines we needed. Back in 2003 the only possibility I had

1 This paper is the written version of presentations I have given on this topic from November 2017 to April 2018 on several occasions, including No Time to Wait 2 in Vienna, The Reel Thing XLII in New Orleans, Restoration Asia V in Bangkok, the SEAPAVAA Conference in Bangkok, and the FIAF Congress in Prague.

to encode, at a reasonable speed, lossless video during the digitising process was by using the HuffYUV video codec.[2]

Some months later I also started testing FFV1, but I have to admit, that at that time I used more the HuffYUV encoding rather than the FFV1 encoding, because it was a more mature video codec and still today it is the faster one of the two.[3]

We did use the AVI container, because at that time it was the easiest for me to implement in our workflow. And I have to admit that at that time I did not know of the existence of Matroska, which had been born one year earlier, in 2002.

1.2 TIFF, DPX, and OpenEXR

For the single-image based film content, we mainly used, since 2005, TIFF in folders and DPX in XML containers.

In 2013 we started testing OpenEXR. The following year we presented for the first time how the Academy's ACES and OpenEXR can be used in an audiovisual conservation and restoration context. Since spring 2015 our regular digital restoration workflow, which applies to two thirds of our work, is based on these technologies. We do actually use MXF, and today we do it in conformity with AS-07. We have presented our experimentations during a *Late Summer School*, in which we mixed together both high-end photochemical experimentations and high-end digital experimentations.

2 I used intensively the version 2.1.1 which is a very solid one. There was also a 2.2 release, but sadly so buggy that it was simply impossible to use in production. Also a multi-threaded flavour of HuffYUV 2.1.1 did exist, but I never played with that one. Later the FFmpeg team released its own encoder and decoder, supporting a wider variety of pixel formats and bit-depths other than 8 bit. This HuffYUV implementation is actually FFV1's close relative, but that's another story. Today, in parallel with FFV1, we are still using the HuffYUV video codec (in the FFmpeg's flavour) as a native encoding format for digitisation, because it's 25% faster than FFV1 and achieves approximately the same lossless compression rate.

3 My personal love and hate story with the FFV1 video codec is given as a footnote:

- The first Description of the FFV1 Video Codec I have worked with was published by Michael Niedermayer on 9 June 2003. This version, later called 0, for a long time in an experimental stage and is considered stable only since 14 April 2006. Sporadically we did actually use the version 0 in production from the beginning of 2004 on for $Y'C_BC_R$ 4:2:2 video at 8-bit per channel.
- I cannot remember when I came first into contact with the version 1, which is stable since 24 April 2009, but we did use it in production a long time before that date, for 8-bit video capturing, in parallel with HuffYUV.
- FFV1 version 2 existed only in an experimental form and its report was finalised by Michael Niedermayer on 8 April 2012 as FFV1 Video Codec Specification, probably the day after the first draft of version 3 was published with the same title. We generated a dozen of files in both version 1 and version 2 for test purpose, but we never switched from 1 to 2 in production.
- The first FFV1 Video Codec Specification of version 3 I know of was published by Michael Niedermayer on 7 April 2012. This version was then improved and tested in-depth by a large group of people around Michael Niedermayer (including Peter Bubestinger-Steindl, Hermann Lewetz, Georg Lippitsch, Carl Eugen Hoyos and Dave Rice) and is officially deemed stable since 17 August 2013. It is currently being standardised by IETF's CELLAR group. In 2016 my company hired Michael Niedermayer for implementing the handling of 16-bit RGB content. Today, in parallel with HuffYUV, we are still using FFV1 as native encoding for digitisation, because it offers good features to the archive and it's on the way to be officially standardised.
- Since Autumn 2015 I have been suggesting enhancements, including tuning the encoding and decoding performances, implementation of LUTs, handling of Bayer-based «raw» formats, HDR and 24-bit per channel formats. I am happy that CELLAR, while finalising the standardisation of versions 0, 1 and 3, has recently started working on an overdue future version 4 of FFV1 as well.

1.3 Beyond RGB

Fifteen years later, in 2018, we are still carrying out in-depth experimentation and our test implementations on both hardware and software are going in various directions.

The majority of the current mid-range and low-range film scanners use a Bayer pattern sensor. This is not a crime at all. On the contrary, it is often the only possibility that archives can afford. The open source codec CineForm RAW and the new proprietary codec ProRes RAW allow users to store these data forms natively. Today FFV1 cannot store raw Bayer-encoded video and can only store the image content after the additional step of de-Bayering, also called de-mosaicing. FFV1 should implement in version 4 the possibility to handle natively Bayer-based content as well.

Currently FFV1 is limited to the $Y'C_BC_R$ and RGB pixel-format families. There is an increasing need to store multispectral content from moving image as well, as done for many years in other fields of conservation and restoration.[4] In one experimental implementation, for example, we apply a quick-and-dirty hack by storing 15 spectral scans as 5 RGB images. This has many similarities to the Filmic project by Jim Lindner, and some similarities as well to high-dynamic range (HDR). Our approach allows us to store in a transparent way this data today. I am confident that once an open-source file format for multispectral moving images is established, we will be able to trans-multiplex and/or transcode our data in that format.

The research on 24-bit per colour channel is going on both the film industry in Hollywood and the IT and gaming industries in Silicon Valley. Of course, at some point such files will also arrive in the archives and therefore we are experimenting on those formats as well and are testing their appropriate handling.

In the internal context of my company, the adoption of a format in the outside world is not an argument and internally we do use many experimental formats on a daily basis. We simply apply at the end a script or program to generate standard files for the delivery to the clients.

2. Data Migration

In 2014 we migrated our internal archive from LTO-4 cartridges, recorded in proprietary formats and as old-styled TAR archives, to LTO-6 with the more modern LTFS formatting. That was 5.7 PB of data on almost 7,500 LTO-4 cartridges. *En passant*, we also transcoded all the uncompressed $Y'C_BC_R$ 4:2:2 video files into lossless compressed FFV1 and wrapped them into Matroska containers. That has saved between one and two thirds of the required storage, depending on the image content. The whole process resulted with an archive of less than 2000 LTO-6 cartridges.

Then we completed two dozen data migrations for different clients' archives. During almost all those data migrations we actually have fixed errors in the structure of the archive, or in the naming and the metadata of the files, and sometimes we have transcoded obsolete formats into current ones as well. Therefore, we actually have maintained and even updated the archives. For example, in one case, the client wished us to replace the existing MD5 checksums with newer SHA-1 checksums.

4 Hyperspectral imaging can be seen as a kind of generalisation of multispectral imaging. Today's computers cannot handle in an efficient way such content, especially not in the domain of moving image, but to keep an eye on these evolutions can do no harm.

Let us take a look at the workflow. The files are read from the source cartridge. The content is sent to a script or a computer program, which can modify what needs to be modified.[5] Then the writing procedure writes the files onto the destination cartridge. The external script or computer program can do a variety of actions on the data, including modifying the container and/or the codec. It might be the audio codec and/or the video codec (and/or other codecs as well). This feature opens a lot of possibilities. The majority of the changes can be done on the fly, without having to save the files temporarily on a hard-disk drive or a solid-state drive.[6]

Possibilities we actually have used so far are documented in the following sections.

2.1 Change the container

ProRes is a very popular format not only for post-production, for which I assume it was originally designed, but also for capture. Therefore we, as archivists, have to find a way to preserve these native ProRes files, as well as the result of a ProRes-based post-production, because this is actually the highest quality available. QuickTime (.mov) is the natural container of the ProRes video codec. Unfortunately, Apple has already limited the support of QuickTime format for Windows, and most probably they will limit its support on macOS soon too, with the launch of the fully 64-bit operating system. One piece of good news is that the bitstream syntax and decoding process of ProRes have been disclosed and published by SMPTE in 2015, therefore we do have officially some technical information about the format. Another piece of good news is that ProRes can also be wrapped into the Matroska container.

One change we sometimes do apply during data migrations is to transform files from ProRes encoded video that is wrapped in a QuickTime (.mov) container to ProRes encoded video in Matroska (.mkv) files. This is technically called trans-multiplexing (or transmuxing) and consists of the de-multiplexing (or demuxing) of the old files followed by a re-multiplexing (or remuxing) into the new files.[7] This operation is also called re-wrapping.

The file can be trans-multiplexed (i.e., the file is first de-multiplexed and then re-multiplexed) very quickly, because transcoding (i.e., the extremely time-consuming decoding and re-encoding) of the file's content is not required. This can be done easily, if needed, during a data migration, without any additional cost.

5 So far, we have used mainly Bash and rarely C, Mathematica or Go to program the scripts for transcoding and/or trans-multiplexing the data, modifying the metadata or deleting unwanted files, yet almost any programming language should work well.

6 Technically this is realised via classic data pipelines.

7 The raw format for the four flavours of ProRes 422 is the same as previously for uncompressed 10-bit video (technically it is called yuv422p10le), but the encoded image is lossy compressed by the ProRes video codec. This image content is neither uncompressed nor lossless compressed! There are also two flavours of ProRes 4444 which may have 10-bit or 12-bit per channel.

2.2 Change both the container and the video codec

During our own data migration, we have transcoded and trans-multiplexed all the AVI files, containing HuffYUV or FFV1 version 0 or 1 encoded video, into Matroska files, encoded in FFV1 version 3 video for preservation purposes.

For different clients we often have trans-multiplexed and transcoded video content from stream-based $Y'C_BC_R$ 4:2:2 uncompressed 10-bit video in AVI, QuickTime, or MP4 files into lossless compressed FFV1 version 3 video wrapped into Matroska files.

Sometimes we have trans-multiplexed and transcoded from single-image-based DPX or TIFF 16-bit, 12-bit or 10-bit images in MXF, ZIP, or TAR files (or even plain folders) into lossless compressed FFV1 version 3 video wrapped into Matroska or into lossless compressed JPEG 2000 wrapped into an MXF container, usually according to AS-07.

2.3 Other changes

There is almost no limitation of the possible changes during data migration. The range spans from simply to perform actions, such as modifying file naming conventions, to more time-consuming actions, such as modifying the metadata. This includes replacing the MD5 checksums by SHA-1 checksums, or fixing incorrect or missing information about frame rate or colour space, for example.

Data migration can also be used to delete unwanted files such as Apple's .DS_Store and Window's Desktop.ini files which may be written inadvertently onto the source cartridge.

In conclusion, taking account of our experiences so far, I am personally very confident that in the near future, when we will be obliged to migrate our company's archive from LTO-6 to LTO-8, we will be able to replace the experimental containers and video codecs by more robust formats. This may be the case possibly in 2019 or 2020, after the launch of LTO-9, when the prices for LTO-8 will be diminishing.[8]

In my opinion, archives should adopt the formats that they can better master and handle today, knowing full well that their choices are not made forever. On the contrary, they will be able to change, if needed, during each of the coming data migrations at no or little additional cost.

8 Most probably we will then also switch from making three copies to only two copies, yet this topic's discussion is for another article.

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VICKI SHIVELY,
GEORGE BOSTON,
LARS GAUSTAD, AND
DIETRICH SCHULLER

Joining Forces in Audiovisual Digitisation, Digital Preservation and Access: The Indian and the Flemish Approach

Irfan Zuberi (NCAA) and Brecht Declercq (VIAA)

ABSTRACT

The paper presents the benefits of a collaborative approach in the domain of audiovisual archiving in two very different contexts: NCAA in India and VIAA in Flanders. Following an initial contextualisation in the respective countries, the authors share a detailed modus operandi, outlining the functionalities and traceability matrices of the implementation processes involved in the networks that they have managed to build. Especially critical are the insights and parallels between NCAA and VIAA in the domains of audiovisual digitisation, digital preservation and access. Concluding with a look to the future, the authors hope to put forward the idea that a well-defined collaborative approach has the potential of functioning as a possible solution to the needs and aspirations of all stakeholders - content providers, digitisation agencies, archival network and a wide range of potential users.

1. Introduction & Background

Introduction

For over ten years now, many institutions managing non-file-based audiovisual collections have become pressingly aware of the grand challenge of audiovisual preservation, metaphorised so magnificently by Indiana University's Mike Casey as the monster called 'Degralescence'.[1] Casey suffices with mentioning the keywords 'large numbers', 'obsolescence', 'degradation', 'high research value' and 'short time window'. We don't deem it necessary for the audience of the IASA Journal to elaborate or prove Casey's points which we fully underwrite and concur with.

While many institutions globally are now arduously busy with the preparative or even operational phases to bring this two-headed monster down, many amongst us have found ourselves confronted with Degralescence's villain accomplices - Dissension and Austerity. In this article, we present a particular strategy to tackle the monster and its accomplices and it can be summarised in one word - Collaboration. We do this by comparing two successful applications of this approach from two very different parts of the world, but showing a striking number of parallels: NCAA in India and VIAA in Flanders.

Background

A large volume of India's cultural wealth, created during the last several decades, is stored in audiovisual form with governmental and non-governmental institutions and private collections. The content of these holdings enshrines the creativity of some of India's greatest artistic talents. Needless to say, this is an invaluable national heritage that needs to be preserved in perpetuity and also made accessible to the citizens of the country and, indeed, the world. In the absence of systematic and up to date preservation technologies, lack of awareness and proper upkeep, as well as the fragility of the medium they are stored in, these resources are in imminent danger of being lost forever. Moreover, with frequent changes in hardware and advancements in technology, the playback of these audiovisual resources, which are mainly in analogue format and stored on different types of tapes, records, cylinders etc., has become a

1 Casey, M. (2015) Why media preservation can't wait. The gathering storm. In: *IASA Journal*, 44 (1, 2015).

global challenge. Given this background, the Ministry of Culture, Government of India, on 1 April 2014, sanctioned the approval for and entrusted Indira Gandhi National Centre for the Arts (IGNCA) to set up the 'National Cultural Audiovisual Archives.'

Mutatis mutandis the same situation was present in Flanders, where, as early as 2006, the urgency of audiovisual preservation made its way to the political agenda. During several research projects between 2008-2010, media as well as heritage institutions prepared what was then still quite uncertain: the founding of an organisation dedicated to the digitisation, sustainable digital preservation and giving access to the region's vast and wealthy, but also technically diverse and widely spread audiovisual heritage. Discussions back in those days were mainly about technical differences between the cultural heritage institutions and the broadcasters and about the question whether this institution, in spirit, should be conceived more from a centralising or a distributed functioning. These issues soon proved to be superable, but the aftermath of the economic crisis caused a vast delay in the execution of the plans. On 21 December 2012 however, the mission of founding a 'Flemish Institute for Archiving' (henceforth: VIAA), fostering it and raising it to become an independent organisation within two years was given to iMinds, an institute of the Flemish government offering support, research and incubation facilities to companies and organisations in the field of ICT and broadband technology.

In India, the vision of National Cultural Audiovisual Archives (henceforth: NCAA) is the creation of a state-of-the-art digital repository, geared for long-term preservation and dissemination of the content that it receives from its partnering stakeholders. The designated community of NCAA, the first audiovisual archive of its scale and kind in India, covers a wide range of potential users, including scholars, researchers, practitioners of the arts, media professionals, connoisseurs and aesthetes in general. In terms of its mission, NCAA positions itself as an archive of archives and an integrating platform for repositories that are scattered all over the country and had been working in relative isolation. The principles of Open Access have been a driving force for NCAA and it streams the content it receives from its partnering stakeholders in the public domain through its web portal. In its recently concluded Pilot Phase, during 1 April 2014 – 31 March 2018, NCAA has had several major achievements. It pursued digitisation standards that are in line with those recommended by IASA and customised the Dublin Core metadata schema to suit the uniqueness of the holdings of its partnering stakeholders, thus ensuring uniformity and the possibility of interoperability. Over 30,000 hours of audiovisual resources have been digitised from the repositories of twenty-two (22) partnering stakeholders of NCAA, featuring the broadest possible interpretation of Indian arts and culture, including visual and performing arts, oral traditions, documentation of traditional crafts, textiles, theatrical practices, community lifestyles and traditional knowledge systems. Perhaps the biggest achievement of NCAA has been its certification under the ISO 16363:2012 standard, thus becoming the world's first audited and certified Trustworthy Digital Repository.

In VIAA's first 24 months, still very much characterised by uncertainty and inconsistency of political support, the strongest need was felt to be its own confirmation. Its first mission statement was therefore very straightforward: "VIAA aims to digitise and preserve the Flemish audiovisual heritage and make it accessible for everyone." Within its three core activities – digitisation, archiving and interaction – VIAA achieved to set up three major works: a digitisation project, the largest up until then in Flanders, involving no less than audiovisual 170,000 carriers from 40 organisations; a sustainable digital storage infrastructure of 2x300TB disk space and 2x17PB on LTO, ruled by a state-of-the-art HSM and a multi-tenant MAM system; and a first way for the public to access the content, in the form of an educational platform filled with audiovisual archives content, designed to fit the needs of Flemish primary and secondary school teachers.

These results were followed by a prolongation of VIAA's mission by the Flemish government in 2015 with a yearly subsidy of around 4.4 million euros. This allowed VIAA to expand its activities massively in the past 4 years and to become an independent institution separate from iMinds. Today VIAA has a staff of 23 full time equivalents, works for 140 public, commercial and regional broadcasters, cultural heritage institutions, city archives, government bodies and performing arts organisations together called 'content partners'.[2] The ambition is to digitize the 650,000 audiovisual carriers of their collections by 2021. The 17PB digital storage space is already filled by half and is managed through a MAM system with a tenant for every content partner. Thanks to a shared catalogue, the content partners can take a look into each other's collections and the educational platform Het Archief voor Onderwijs (The Archives for Education) already reaches a large share of the Flemish teachers corps.

2. Modus Operandi

2.1 Coming Together

Detailed consultations at several levels formed part of the process of setting up the NCAA. These included discussions at the Ministry of Culture, Government of India and consultations with subject experts in the domain of audiovisual archiving. The purpose of this effort was to work towards bringing together the various stakeholders who would be involved in the implementation processes of NCAA. Following several such consultations, a consolidated meeting of experts was convened on 19 July 2013 to discuss the modalities of the NCAA initiative and issues related to its functioning were deliberated upon. These included concerns with regard to the setting up of a Pilot Phase project management unit, adherence to standards, modalities of digitisation, identification of contributing organisations (henceforth: Partnering Institutions), shortlisting of audiovisual formats for the Pilot Phase, development of a MAM system and issues related to intellectual property rights.

As mentioned above, the concept of VIAA grew from the idea that the solutions to the threats to Flemish audiovisual heritage would necessarily be technologically advanced and expensive. Yet, as in India, the model of cooperation was not clear from the beginning. The broadcasters and cultural heritage institutions involved had very different missions and these were naturally reflected in their vision on digitisation, archiving and access to their collections. However, from the end of the 2000s onwards, the Flemish government made it clear to everyone involved that if it would reserve resources for the audiovisual heritage, there couldn't be any question of tranching over the full range of institutions managing audiovisual heritage collections. In other words, collaboration was the only realistic model, even beyond the traditional sectoral boundaries.

It was clear from the beginning that NCAA and VIAA had no intention whatsoever of replacing their content partners in any of their activities. For both, the intent is to be complementary: where the partnering stakeholders lack the knowledge and resources to set up processes around digitisation, archiving and access, NCAA and VIAA offer opportunities to them, thus providing specialisation more on a technical than on a content level.

2 A full overview of VIAA's content partners can be found on https://viaa.be/en/partners.

2.2 The 'NCAA Memorandum of Agreement' and the 'VIAA Deal'

Among the key topics of discussion during the consolidated meeting of experts held on 19 July 2013 prior to the setting up of NCAA was the incentives to be given to and the responsibilities envisaged for the potential Partnering Institutions. A template memorandum of agreement was drawn up, with an adequate bias in favour of the incentives that would be given to the organisations that come on board with the NCAA.

Incentives-Responsibilities Matrix during the Pilot Phase of National Cultural Audiovisual Archives

S. No.	Incentives	Responsibilities
1	NCAA will coordinate a preliminary survey of the audiovisual collection and its IPR status, and carry out an institutional capability assessment of the 'Partnering Institution' in accordance with approved formats.	The 'Partnering Institution' will provide information about the institutional capability, and assist in the preliminary survey and collection assessment of its audiovisual holdings.
2	NCAA will assist in the creation of a catalogue of the complete audiovisual holdings of the 'Partnering Institution' to be shared online through the NCAA Web Portal.	The 'Partnering Institution' will make the complete catalogue of its audiovisual holdings accessible in the public domain through the NCAA Web Portal.
3	Based on the significance, condition and IPR status, a part of the holdings of the 'Partnering Institution' would be identified, in consultation with the 'Partnering Institution', to be taken up for digitisation.	The 'Partnering Institution' will help in the identification and prioritisation of the whole or part of the collection that can be taken up for digitisation and public access.
4	NCAA will extend support for metadata creation for the selected portion of the audiovisual holdings of 'Partnering Institution' in the approved extended Dublin Core schema.	The 'Partnering Institution' will identify personnel for metadata creation as per NCAA's approved guidelines.
5	Selective digitisation of the audiovisual collection of 'Partnering Institution' would be undertaken at the behest of the NCAA. The digitisation would be done by a third party agency selected through due process.	The 'Partnering Institution' will nominate a coordinator to liaise with the digitisation agency in order to ensure secure transportation and efficient digitisation of the selected content.

Incentives-Responsibilities Matrix during the Pilot Phase of National Cultural Audiovisual Archives		
6	Centralised public access of the digitised audiovisual material with metadata sourced from the 'Partnering Institution' will be arranged under a non-exclusive Open Access regime by the NCAA in collaboration with C-DAC.	The 'Partnering Institution' will check the quality of the digitised output in line with the digitisation standards and quality assurance guidelines of NCAA, including carrying out a process of metadata verification and enrichment.
7	NCAA will undertake outreach & awareness programmes for wider dissemination of the initiative in collaboration with the 'Partnering Institution'.	The 'Partnering Institution' will help in the identification of significant collections beyond the 'Partnering Institution', both in institutions and with individuals that form a part of the extended network of the 'Partnering Institution'.
8	NCAA will conduct training & capacity building in the areas of documentation, metadata creation, and handling of audiovisual materials for the personnel of the 'Partnering Institution'.	The 'Partnering Institution' will take initiative in organising training, outreach & awareness programmes to spread the mission of NCAA within its extended network.

Table 1 - NCAA Pilot Phase Incentives-Responsibilities Matrix

Importantly, it was made clear from the start that the entire cost incurred on digitisation of select holdings from the Partnering Institutions would be borne by NCAA. Further, in case any Partnering Institution required assistance for metadata creation in the schema approved for the NCAA, the NCAA also agreed to support the salary of hired contractual staff up to a period of one year. Finally, financial assistance has also been provided for staff from Partnering Institutions to attend training programmes conducted by NCAA.

At VIAA, more or less the same story happened. In principle, all the partners were free to refuse a collaboration with VIAA. In practice, however, VIAA's proposal proved to be too attractive for them to pass up. It starts from what one might call 'the VIAA deal'. This means, first and foremost, that VIAA uses its own government subsidy to pay for the digitisation of the holdings of its content partners. Furthermore, the content partners also receive a sustainable digital storage service in exchange for a limited contribution to the costs. In exchange for these services, the content partners grant to VIAA a non-exclusive license to use the content on its own platforms to the extent that they themselves are rights holders.

Although this deal for the content partners has certainly proven to be incentivising, we should not underestimate the efforts that are expected from them. In preparation for the digitisation, they have to label, package and register all carriers with a number of technical characteristics in an online database made available by VIAA. For example: for the registration of some 100,000 ¼" audio tapes alone, the public broadcaster VRT has employed two full-time employees for almost five years. In addition, the content partners are also expected, once have their material digitized, to perform a quality check on the result and to provide descriptive metadata.

2.3 Typology of Stakeholders

The Partnering Institutions of NCAA represent variety along multiple axes – governmental/ non-governmental, regional/pan-Indian, archives/museums and research centres/production and broadcasting houses. The important thing, however, is that, as indicated earlier, they have come together due to a shared base of common and mutual values, resources, interests and aspirations. The following is a typology of the Partnering Institutions of NCAA:

i. National Archives: The purpose of national archives is to systematically collect and document the heritage of the nation.
National Archives of India, National Institute of Design, Indira Gandhi National Centre for the Arts, Indira Gandhi Rashtriya Manav Sangrahalaya, Centre for Cultural Resources and Training, Indian Council for Cultural Relations, Sahitya Akademi & Sangeet Natak Akademi

ii. Research Archives: Research archives can be described as having specific subject interests like events from certain periods in history, regional mandates, coverage of specific cultural groups or particular art forms etc.
Rupayan Sansthan, Samvaad Foundation, Natya Shodh Sansthan, Sangeet Parishad Kashi, Saptak Archives, Shri Kashi Sangeet Samaj, All India Kashiraj Trust, Indira Kala Sangeet Vishwavidyalaya, Jatin Das Centre of Art, Kalakshetra Foundation, Kerala Kalamandalam, Manav Uttardayitav & Regional Resource Centre for Folk Performing Arts

iii. Production & Broadcast Archives: Production & broadcasting archives contain archival material created with the specific purpose of dissemination, publication and commercial broadcast/telecast.
Cinema Vision India

These twenty-two (22) Partnering Institutions of NCAA are spread across a total of twelve (12) cities across the country. The map given below points the cities with the number of Partnering Institutions in them indicated in parentheses.

Map 1 - NCAA Pilot Phase - Cities with Partnering Institutions

From a budgetary and organisational perspective, it was impossible for VIAA to roll out its activities from the beginning for all audiovisual heritage managing organisations in Flanders. VIAA initially restricted its group of content partners to the thirty (30) recognised and subsidised cultural heritage institutions in Flanders, supplemented by the nine regional broadcasters and the public broadcaster VRT. As soon as the budget allowed, new groups of partners were added. The recognised but not subsidised heritage institutions were the first to join, followed by the archives of several government departments. The main city and municipality archives soon followed. Since 2016, performing arts organisations and the so-called heritage cells (inter-municipal partnerships in heritage management) have also become content partners of VIAA.

As can be expected, all these organisations are very different. Yet they can be grouped according to a few characteristics. The cultural heritage institutions (libraries, archives, museums and city archives) usually focus on one subject, city or region, artistic discipline or broader social theme, which is not always delineated in time. Their audiovisual collections are therefore technically quite diverse. Also, their storage conditions are almost never adapted to the requirements of professional audiovisual carrier storage and they sometimes acquire material in poor state. Descriptive metadata are often present only to a limited extent and the content is often produced for a rather specific audience. All these circumstances make the digitisation and contextualisation of this material sometimes rather challenging.

Things are completely different in the media sector. While the size of a regional broadcaster's archive is usually comparable to the largest ones of the cultural heritage sector, the national broadcasters are of a different order of magnitude. For example: the total quantity of Betacam cassettes of the commercial broadcaster VTM to be digitised is about 65,000. That's 3.5 times as much as the largest audiovisual collection in the cultural heritage sector. The broadcasting collections are not only larger, but also technically more homogeneous. Given the available technical expertise and the fact that the institution who created the content is also its custodian, the carriers are (on average) also in a better state. The material is produced for a large audience and in terms of descriptive metadata, at least a basic level is usually provided. The digitisation and the opening up of this material are therefore no doubt simpler.

The collections of the performing arts sector have quite a few parallels with those of the cultural heritage sector, but what the broadcasters and the performing arts organisations have in common, is that archive management is not their core task. The collections from the performing arts sector are the smallest, with a maximum of around 2500 carriers per organisation. Technically, they are rather heterogeneous, but handy video formats (VHS, DV cassettes, DVD) do stand out clearly in quantity. As with the broadcasters, in the performing arts institutions the archives managers work for the same organisation as the one who created the content. The fact that these archivists can focus on one theme - the oeuvre of their own employer - together with the fact that they are often still in close contact with the creators of the content, has a positive effect on the knowledge about what's on the carriers. Although the storage conditions in this sector often are clearly more peculiar than in the heritage sector and at the broadcasters, the condition of the carriers is usually quite good as a result of their relatively young age.

2.4 Digitisation Coordinator

The next point of comparison that this article would like to tackle is in the organisational aspects of the titanic work of digitisation. Here, too, a clear parallel is visible. NCAA followed a multi-layered process of selecting a digitisation agency that it collaborates with in its role as the digitisation coordinator for its Partnering Institutions. Several factors had to be taken into account as part of this process – where would the digitisation take place, how would the analog material be transported, what would be the way to ensure an in-built quality check in the process, when would the analog material handed over to the digitisation agency be received back as part of a consignment that would also contain the digitised output and several other such concerns. All such issues were discussed in several rounds of meetings with Nodal Officers from the Partnering Institutions of NCAA to ensure that all their concerns were factored in and resolved.

In order to oversee the process of selection of the digitisation agency, the Steering Committee of NCAA set up a Tender Committee which worked closely with the Technical Sub-Committee of NCAA to ensure that administrative, technical and financial aspects were all looked at by experts in the respective fields. The Tender Committee guided NCAA in the preparation of a Request for Proposal which served as a public tender, inviting digitisation agencies from India and abroad to submit proposals. A two-bid process was put in place in such a way that technical bids were assessed and analysed by the Technical Sub-Committee and only those agencies which cleared technical assessment were considered for comparative financial bids. The technical assessment process included sample digitisation of the following audio and video formats that were shortlisted for the Pilot Phase, taking analog material from the repositories of the Partnering Institutions of NCAA:

Audio: ¼" Audio Tape, Audio Cassette & DAT
Film: 16mm Film Reel
Video: U-Matic (Hi-Band & Low Band), Betacam, VHS, Mini DV & Hi8

The Request for Proposal was advertised on 15 September 2015 and NCAA signed an agreement with Prime Focus Technologies Private Limited on 1 March 2016 following the completion of the selection process. The intervening period comprised several rounds of technical scrutiny and a visit to the digitisation facility even after technical assessment of digitised output had been cleared and financials had been mutually agreed upon. The signed agreement contains sections on the digitisation process, adherence to standards, quality check mechanism, clauses on non-disclosure of digitised output, file-naming protocol, delivery of archival and access quality digitised output and standard operating procedures to be followed by NCAA and its Partnering Institutions with regard to the digitisation activity. Over the course of two years in its role as digitisation coordinator, the following is a summary of the digitised output from the repositories of the Partnering Institutions of NCAA over the course of a total of seven installments:

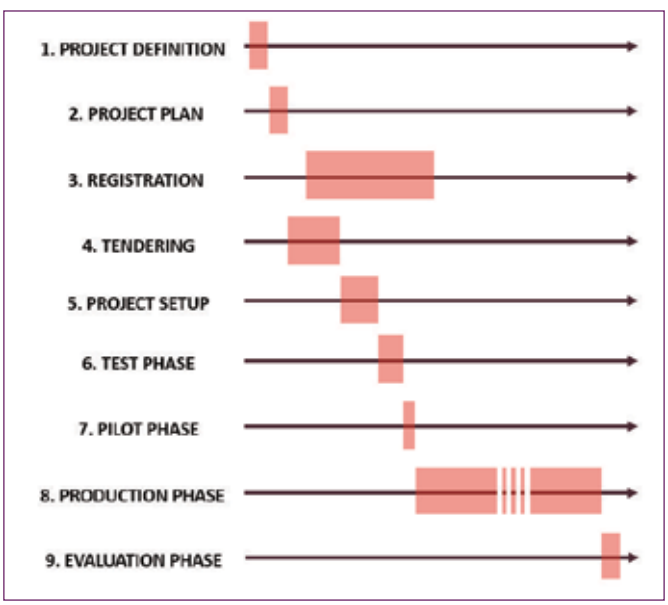
Digitisation Activity in the Pilot Phase of National Cultural Audiovisual Archives

S. No.	Partnering Institutions	City	Audio (hours)	Video (hours)	Total (hours)
1	Centre for Cultural Resources & Training	Delhi	430	147	577
2	Rupayan Sansthan	Jodhpur	1422	1507	2929
3	Indira Gandhi Rashtriya Manav Sanghrahalaya	Bhopal	1775	2189	3964
4	Cinema Vision India	Mumbai	--	2942	2942
5	Indian Council for Cultural Relations	Delhi	1195	3547	4742
6	Indira Gandhi National Centre for the Arts	Delhi	2818	1922	4740
7	Natya Shodh Sansthan	Kolkata	154	147	301
8	Saptak Archives	Ahmedabad	38	--	38
9	Samvaad Foundation	Mumbai	696	20	716
10	Sahitya Akademi	Delhi	2869	--	2869
11	Kalakshetra Foundation	Chennai	3515	340	3855
12	Jatin Das Centre of Art	Bhubaneswar	318	--	318
13	All India Kashiraj Trust	Varanasi	14	336,78	350,78
14	Shri Kashi Sangeet Samaj	Varanasi	538	79	617
15	Sangeet Parishad Kashi	Varanasi	177	--	177

Digitisation Activity in the Pilot Phase of National Cultural Audiovisual Archives					
16	Indira Kala Sangeet Vishwavidyalaya	Khairagarh	1151	667	1818
17	National Archives of India	Delhi	--	0,2	0,2
18	Sangeet Natak Akademi	Delhi	19,3	11,2	30,5
19	National Institute of Design	Ahmedabad	115	500	615
	Total		17244	14355	31599

Table 2 - Digitisation Activity in the Pilot Phase of NCAA

The search for suitable digitisation service providers was and still is one of the core tasks at VIAA. While NCAA was looking for a single digitisation company for all types of carriers to undercut coordination-related problems, VIAA decided to look for the most suitable company for each type of carrier. In 2013, a tender was launched for the digitisation of Betacam SP and U-Matic cassettes, ¼" audio tapes and audio cassettes, summarised under the project name 'Digitisation Wave 1'. As with NCAA, it was necessary to take these first steps to create an atmosphere of complete transparency and trust. VIAA therefore convened the technical managers of all content partners and carefully listed all the concerns and requirements in each part of the process. After intensive consultation, a tender specification with four lots was established, won for the video carriers by Memnon Archiving Services S.A. and for the audio carriers by SONIM S.A., both based in Brussels. After months-long phase of further logistical, organisational and technical detailing of the process and extensive testing, the first carriers were digitised on 4 December 2013.



Scheme 1: Phasing of VIAA's Digitisation Projects

This first project was not only one of the three major achievements in VIAA's first operating year, it also set up a scalable model and structure for most of the upcoming projects. Yet we can say that every digitisation process is slightly different. For example, in 'Digitisation Wave 2' the numbers of carriers to be digitised were much lower, but the technical challenges with a diverse set of open reel video tapes, Philips VCR cassettes, wire recordings and wax cylinders were all the greater. In the meantime, the structures and workflows that had been set up had already proven their value and a great deal of trust had grown between VIAA and the content partners. This enabled VIAA to set up more complex projects, such as 'Digitisation Wave 5', for about 18500 lacquer and shellac discs from sixteen (16) content partners. Because of the fragility of these carriers, they were not transported to the digitisation company, but a complete on-site digitisation chain was set up by the French audio digitisation company Gecko SAS at the premises of VRT, the content partner with the biggest collection involved.

Since 2013 VIAA has set up digitisation projects for more than 470,000 carriers from 140 organisations. For these projects it called upon the services of eight digitisation service providers in four countries. As all the processes were designed with scalability and an ultra-light overhead cost as a main focus, these projects have proven to be manageable with no more than four staff members from VIAA's side.

2.5 Digital Preservation

Given that most of the Partnering Institutions of NCAA do not necessarily possess the technological infrastructure required for the all-important task of digital preservation of digitised content, NCAA carries it out both as an important incentive and a critical service to its stakeholders as a dedicated audiovisual archive.

§ Archival Quality Data

The archival quality digitised content is provided to NCAA by the digitisation agency on two identical sets of LTO tapes. The media files that form part of archival quality data are in open source formats – .mxf & .wav and the three accompanying report files are in .pdf/a format. These two sets are stored in two different seismic zones – New Delhi and Bengaluru – in climate-controlled environment. At the end of the Pilot Phase of NCAA, the quantum of archival quality data has reached approximately 3.5 PB. NCAA maintains a thorough database of the LTO tapes and periodically carries out randomised checking to ensure data integrity.

§ Access Quality Data

The access quality digitised content, along with corresponding metadata, forms the complete set of access quality data. The media files that form a part of access quality data are in the following formats – .mp4 & .mp3 and the three accompanying report files are in .docx, .xlsx and .pdf formats. This data is stored on five platforms to ensure sufficient data redundancy: NCAA local server with 50 TB storage, Partnering Institution-specific external HDDs with NCAA, mirrored external HDDs with the respective Partnering Institutions, on the NCAA Digitalaya (the back-end of NCAA Web Portal), and the Disaster Recovery site of National Informatics Centre. At all these locations, constant MD5 and SHA1 checksums are deployed to preserve bit integrity given that the access quality data is used in multiple ways by the Partnering Institutions and NCAA and is accessed online by users.

When it comes to sustainable digital archiving, at VIAA the same principles apply. As in India, it's all about technically complex processes and expert knowledge and infrastructure not always present at every collection managing institution. Here too, large economies of scale are made by developing a joint infrastructure for components such as the digital (online, nearline and offline) storage, the hierarchical storage management (HSM) or the MAM system. The content partners also receive a constant overview of everything that they have stored in the archive by means of an online live dashboard. In addition, the services around it are shared: transcoding, exchange of metadata, but also more abstract ones such as the so-called 'preservation watchdog' (a permanent monitoring of the obsolescence of file formats and codecs). In the future, one could even think of a joint purchase of automatic feature extraction services for example.

Image 1: Screenshot of VIAA's live dashboard for content partners

Also in this domain, VIAA has built a solid track record over the last 5 years. In 2013-2014, a MAM system (Zeticon Mediahaven) was purchased and implemented, which is used by hundreds of users and dozens of services already. Besides, the servers and LTO tapes do not only serve as a central intake point for digitised sounds and images. They are also the gateway to VIAA's services for digitally-born content. The most striking project that VIAA realised in this area was a complete, synchronized copy of the VRT archive, which was made between August 2016 and March 2018. As master formats for video, VIAA uses MXF/MJPEG2000 for the cultural heritage content and MXF/IMX D10 for broadcast content. For content coming from film, a DPX sequence is the master format for the images, an uncompressed LPCM/WAV is used for the audio. For immediate professional reuse, an Apple ProRes 4:2:2 (Normal) is also made as a mezzanine. Browse copies for both film and video are in .mp4. For audio, VIAA uses an uncompressed LPCM/WAV as a master format and .mp3's as browse copies. All reporting files are in XML, drawn up according to a PREMIS compliant schema.

2.6 Access Platform

Online access is provided through the NCAA Web Portal, the details of whose back and front end are as follows:

1. Back-end: NCAA commissioned the Centre for Development of Advanced Computing in Pune to design and develop an e-Library and archival system named "DIGITĀLAYA" to integrate digitised data with metadata on the cloud server of National Informatics Centre. NCAA DIGITĀLAYA serves as the MAM system at the back-end of the NCAA Web Portal. It is a complete solution reflecting the workflows and processes of NCAA with two roles at the level of the Partnering Institutions - Submission Information Package (SIP) Creator (responsible for the task of metadata creation) and Archivist (responsible for the task of ratification of the metadata created by the SIP Creator). At the level of the NCAA Pilot Phase project management unit, there are two additional roles - Archival Administrator (responsible for addition of Partnering Institutions and creation of metadata templates) and Director (responsible for publishing the material ingested into the archive on the web portal).

2. Front-end: The web portal at http://ncaa.gov.in/repository/ is the front-end of the NCAA DIGITĀLAYA. The access quality digitised data is integrated with the verified and enriched metadata in the NCAA DIGITĀLAYA prior to being published on the NCAA web portal, along with the accompanying reports mentioned above in the section on digital preservation.

The NCAA Memorandum of Agreement speaks of: (a) providing free accessibility to copyright-free and those audiovisual content over which the Partnering Institutions hold rights of ownership, and (b) preparing suggested guidelines for obtaining intellectual property rights and other relevant copyright clearances for all other audiovisual content shared by the Partnering Institutions with NCAA. Envisaged as a means to inject egalitarianism in the access of authenticated archival audiovisual content and driven by concerns entailed with public funding, NCAA has taken bold steps into the terrain of Open Access. As of May 2018, over 23,000 hours of audiovisual content is accessible on the NCAA Web Portal representing the cultural diversity of India in the broadest sense.

Just as at NCAA, at VIAA the backbone of the media management is in the MAM system. Through this system the content partners can access their own content via a separate tenant that is created as soon as their first file is ingested on the VIAA servers. Technically speaking the SIP is created by VIAA itself and consists of the essence files and one or more XMLs describing the file's lifecycle.[3] The metadata fields in the MAM then allow for an EBU Core compliant description of the content and also leave space to add remarks gathered during a human quality check. Content partners can export their own master, mezzanine and browse copies and metadata files as they want.

In the front end VIAA has until now set up four major outlets. The most important and most successful one is 'Het Archief voor Onderwijs' (Archives for Education). After a one year beta phase in 2015, it was officially launched in January 2016. Fed by an editorial team from VIAA itself and supported by archival researchers at VRT, this platform provides teachers with carefully selected archival material for direct use in the classroom and in line with the official curricula and learning objectives. In two years, it firmly established itself with a large

3 For digitised films also a scan of the original film can(s) is added.

share of the Flemish teachers, even though the content provided on the platform doesn't serve every subject on every level yet.

A second outlet channel of VIAA was a temporary, yet very successful one. 'De Beeldcapsule' (The Image Capsule) was a public campaign organised in 2015 and 2017 and aimed at raising the awareness of wider audience of the value of the national audiovisual heritage and the threat it is under. The website featured 50 appealing, humorous or nostalgic clips from a broad range of collections, thus demonstrating directly their diversity and cultural wealth. Visitors were encouraged to indicate their favorite clips by adding them to a time capsule and sending them symbolically to the year 2115 and 2117 respectively for our successors to be able to get an idea of what happened a century before. Both campaigns gathered wide acclaim and extensive attention from the national media and the 2015 edition was even nominated for the FIAT/IFTA Awards.

VIAA's third main outlet is strictly speaking not a public one, as the access to it is strictly limited to content managers, curators and archival researchers working for the content partners. The 'Catalogus Pro' (Catalogue Pro) allows these staff members within certain limits to rifle through each other's collections, thus encouraging cross-sectoral and cross-institutional reuse of the content. As with the Archives for Education, within a few months of its launch, the Catalogus Pro became a fixture for its target group.

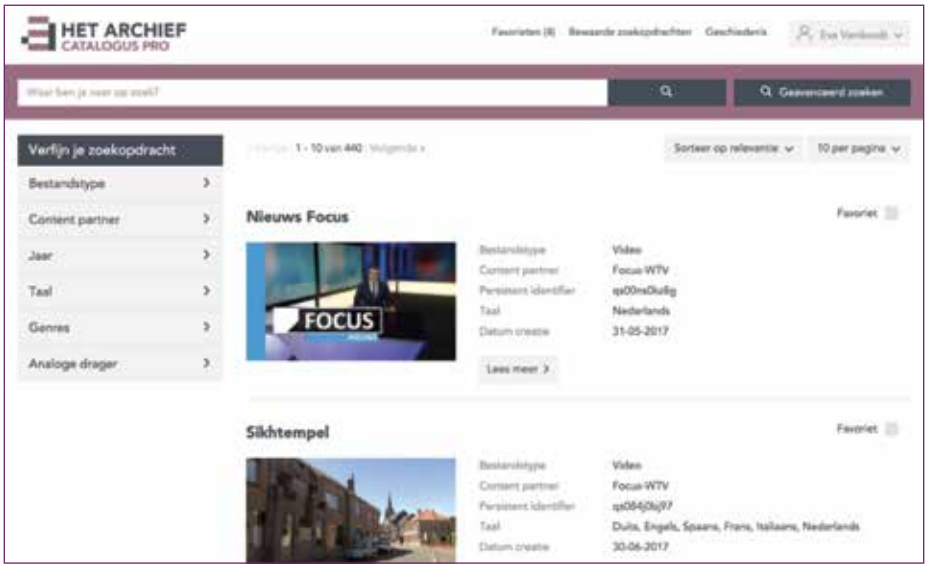


Image 2: screenshot of VIAA's cross-institutional search platform Catalogus Pro.

Fourth and last major outlet of VIAA is the content platform 'Het Archief' (the Archives). Currently this platform only features a newspapers collection from World War I, coming from a one-off paper digitisation project executed by VIAA. However, the plan is to use this platform in the coming years to show audiovisual content from the content partner's collections in the public domain. However, in order to convince the content partners that they too can show content from their collection without incurring extensive copyright infringement risks, VIAA will also need an initiative similar to NCAA's Intellectual Property Rights Advisory explained below.

2.3 Intellectual Property Rights Advisory

Since most Partnering Institutions of NCAA do not have audiovisual archiving as a part of their institutional mandate, NCAA had factored in the need to set up a well-researched intellectual property rights advisory from the start. Towards that end, the Steering Committee of NCAA oversaw the selection of Centre for Internet & Society by the Intellectual Property Rights Advisory Committee of IGNCA for the task of working closely with NCAA to generate a set of documents that could serve as ready reference in the legal domain. This was especially necessary given that NCAA is committed to the principles of Open Access and wanted to address all possible concerns of its Partnering Institutions to enable maximum outreach of their audiovisual resources in the public domain. The process of generating the intellectual property rights advisory has been an arduous sub-project within the NCAA initiative, including site visits, meetings with institutional heads, interfacing with officials at the Ministry of Culture, Government of India and getting the content of the advisory ratified within the legal community. The table below lists the documents that have been generated which would soon also be made available on the NCAA Web Portal:

Intellectual Property Rights Advisory for National Cultural Audiovisual Archives		
S. No.	**Section – I**	**Section – II**
1	Memo on "Orphan Works" under the Indian Copyright Act, 1957	IPR Licensing Agreement
2	Memo on Government Copyright under the Indian Copyright Act, 1957	Comprehensive IPR Policy for NCAA & Partnering Institutions
3	Comprehensive Takedown Notice and Disclaimers	Recommendations on Dissemination of Content & Possible Monetization/Revenue Sharing Agreement
4	Memo on "Fair Dealing"/"Fair Use" and its application under the Indian Copyright Act, 1957	Policy Recommendation Brief for the Ministry of Culture, Government of India
5	Memo on "Traditional/Community Knowledge" under the Indian Copyright Act, 1957	Memo on Performer's Rights
6	IPR Data Collection Form	Memo on Principles of GLAM (Galleries, Libraries, Archives & Museums) and Access to Knowledge
7	Memo on Copy Determination related to Archival Content	Memo on Curation, Access and Usage of Digital Archives
8	Memo on Acquisition of Content (including an analysis of Memorandum of Agreements)	Memo on Cultural Informatics and Digital Humanities
9	Memo on Creative Commons Approach	Catalogue of existing GLAM and/or Open Digital Archives for different genres of resources
10	Site Visits	Consolidated IPR Report

Table 3 - IPR Advisory for NCAA

3. Way Forward & Conclusion

3.1 Way Forward

After this presentation of NCAA's and VIAA's genesis, growth and current activities, the question remains what the future might bring for both organisations. For the next phase of NCAA, a detailed proposal has been submitted to the Ministry of Culture, Government of India. It has been suggested that the recently concluded Pilot Phase be followed by Phase I & II, during the 2018-2023 period. The table below presents an outline of the proposed objectives-targets matrix for the NCAA in the forthcoming timeline of the initiative:

Proposed Objectives-Targets Matrix for Phase I & II of National Cultural Audiovisual Archives (2018-2023)

S. No.	Objectives	Targets
1	Identifying and preserving the cultural heritage of India available in audiovisual form in institutions and private collections across the country through a process of digitisation and making it accessible to the people.	Selection and digitisation of three lakh (300,000) hours of audiovisual resources and curation of fifty thousand (50,000) hours of born digital audiovisual content.
2	Instituting state-of-the-art digitisation and storage systems through the aegis of IGNCA and its partnering stakeholders to preserve these audiovisual resources and ensure access to them over the long-term, in accordance with the ISO 16363:2012 standard.	Creation of two (2) physical archives of digital data with controlled climatic conditions for long-term preservation of archival and access quality digitized audiovisual resources.
3	Scaling up the NCAA Web Portal and offering sustained online access to the audiovisual resources digitised from the repositories of the partnering stakeholders.	Development, maintenance and constant updation of the NCAA Digitalaya and Web Portal in terms of addition of new features, data integrity measures and enabling ease of access and use.
4	Standardisation, periodic upgradation and data migration using the methods and technologies deployed in the production, storage, preservation and retrieval of audiovisual resources.	Establishment of workflows and processes to automate preservation of digital data by way of periodic data refreshment and data migration in order to ensure long-term sustainability.
5	Maintaining the ISO 16363:2012 certification status through constant self-audits in order to clear the annual surveillance audits and renew the certification during the 2020-2023 period.	Periodic updation of core policy documents to reflect updated workflows and processes and carrying out professional advisory for other institutions to achieve Trustworthy Digital Repository status.

Proposed Objectives-Targets Matrix for Phase I & II of National Cultural Audiovisual Archives (2018-2023)		
6	Interfacing with the Intellectual Property Rights regime to suggest the inclusion of archives in the 'fair use' clause under the Indian Copyright Act as well as other related legal instruments.	Publication of white papers on Intellectual Property Rights issues related to the archiving of audiovisual resources.
7	Capacity building and skill development in storage, preservation, metadata creation, digitisation and retrieval of audiovisual resources.	Institutional membership of and representation on international forums such as UNESCO, CCAAA, IASA, FIAF, ICA and SEAPAVAA in order to strengthen the domain of audiovisual archiving in India.
8	Instituting training, outreach and awareness programmes and organising workshops, seminars & conferences to strengthen the domain of audiovisual archiving in India.	Host two (2) national/international conferences, conduct annual training programmes and curate an ongoing series of listening/viewing sessions in order to build capacity and ensure wider outreach.

Table 4 - NCAA Phase I & II Proposed Objectives-Targets Matrix

It is hoped that the ISO 16363:2012 certified Trustworthy Digital Repository status of NCAA will help in leveraging it as a model solution within the expanding realm of Cultural Informatics and Digital Humanities in India so that other aspects of Indian arts, such as digital iterations of manuscripts, visual art, photographs and other such objects may be incorporated within its purview. There are, however, external as well as internal challenges that present themselves before the vision that NCAA aspires for. A perceived lack of synchronisation between the various digital initiatives of Government of India and the current shortcomings in terms of infrastructural support within the IGNCA are just a couple of factors that NCAA would have to engage itself with in its next phase of existence.

For VIAA too, the coming years will be a crucial phase in its development. Up until now VIAA has always been supported by short-term agreements with the Flemish Government, which entailed considerable uncertainty and the rather heavy burden to produce an almost constant stream of strategy and planning documents. That is why VIAA is currently striving for a full-fledged management contract in its relationship with the Flemish Government for the period 2019-2023, in which the objectives and the resources set against them are laid down. The main internal factors that will influence this document are the end of the mass digitisation of audiovisual carriers (except for film), the expansion of a descriptive metadata creation strategy, the gradual transition from a private storage infrastructure to cloud storage, the expansion of the intake of born digital materials, a closer digital integration with the infrastructure of the content partners, and last but not least, the offering of archival images and sound for teachers and pupils that reaches full maturity.

Next to that there are also a few external factors of influence. First of all there's the digitalisation of society as a whole, causing an increased demand for sustainable digital storage, not only for audiovisual files. Furthermore, there's the increasing importance of 'content', especially in the educational domain. This domain in itself is also becoming more interactive, more differentiated and more individualised. Another important factor is the political pressure to increase collaboration and generate more internal revenue. Finally, there are notable technological evolutions, such as artificial intelligence, virtual and augmented reality, etc. that have their own unraveling impact.

In these circumstances, the questions for VIAA to solve will be about the further expansion of its partner group - with whom and to which extent, about digitisation post 2021, expansion towards other carrier types, about metadata as a new focus domain, about its own role as a forerunner in the digital innovation of the cultural heritage domain, about the new target groups and strategies to serve them, about how these increased ambitions can be financed and how VIAA as an organisation should adapt. In the best of scenarios, all these questions get a satisfying answer in the upcoming months that will allow VIAA to thrive in the next five years of its existence.

3.2 Conclusion

In this article we have tried to present and compare two initiatives from very different parts of the world that each provide an answer to the challenges posed by degradation and technology obsolescence, digital preservation and increasing demand for access to the audiovisual heritage. Although very different, these answers show striking similarities, provoking the conclusion that if similar answers can fit such different contexts, they might serve as an inspiration for many more. It is therefore hoped that the collaborative approach towards audiovisual archiving, presented in this article would lead others to consider some of the benefits it has yielded for NCAA and VIAA.

Acting as a pivot point between content partners on the one hand and service and goods providers on the other hand not only decreases the knowledge level required at each of the organisations involved, it allows also to obtain far lower prices for those services and goods. One doesn't necessarily have to collaborate in all working domains if that's not possible. Collaboration in one or more areas can already yield very large economies of scale and the thriving force does not have to be a newly established institution as was the case with VIAA and NCAA either. As long as the responsibilities are well-defined, a consortium of peers might reach the same goal. At least at NCAA and VIAA this has made the digitisation, preservation and access to audiovisual heritage a truly collaborative effort.

Sound Practice: Exploring DACS Compliance in Archival Description of Music Recordings

Elizabeth Surles, Archivist, Institute of Jazz Studies, Rutgers University, USA

Abstract

Standardization of descriptive practice supports improved access to archival collections with sound recordings of music, but the standard for archival description in the United States, *Describing Archives: A Content Standard* (DACS), does not supply specific rules for describing music sound recordings. Instead, it recommends supplementary standards without indicating how to incorporate them in a DACS-compliant finding aid. Given the wide range of descriptive options available via this recommendation, this exploratory study evaluates the extent to which finding aids for music collections with sound recordings successfully follow DACS, both in overall compliance and in the application of *The International Association of Sound and Audiovisual Archives (IASA) Cataloguing Rules*, the only supplemental standard recommended by DACS that covers music sound recordings. Drawing from a randomized, purposive sample of 20 finding aids for music collections at 11 repositories, this study applies document analysis to establish common reasons for non-compliance and evaluates the elements required by DACS in each finding aid. The results show low compliance with DACS and that the finding aids in the study commonly fail to apply IASA's *Rules* correctly in description of music sound recordings.

Introduction

Standardization of descriptive practice supports improved access to archival collections with sound recordings of music; however, description of music sound recordings is complicated because of the unique characteristics of both music and sound recordings. The standard for archival description in the United States, *Describing Archives: A Content Standard* (DACS), does not supply specific rules for describing music sound recordings. Instead, DACS recommends supplementary standards, including *The International Association of Sound and Audiovisual Archives (IASA) Cataloguing Rules: A Manual for Description of Sound Recordings and Related Audiovisual Media* and the *Oral History Cataloging Manual* for guidance on sound recording description (Society of American Archivists, 2013, p. 142). Given the wide range of descriptive options available via these recommendations, this study considers their utility and examines the extent to which finding aids for music collections with sound recordings successfully follow DACS. Drawing from a randomized, purposive sample of 20 finding aids for music collections at 11 repositories, this study applies document analysis to establish common reasons for non-compliance and evaluates the required elements in each finding aid according to DACS instructions for description. This two-pronged approach provides both a baseline evaluation of whether the finding aids comply with DACS requirements and qualitative analysis of archival description of sound recordings in the finding aids, including adherence to IASA's *Rules*, the only supplemental standard that covers music sound recordings. The results show low compliance with DACS and that the finding aids in the study commonly fail to apply IASA's *Rules* in description of music sound recordings.

Background

Archivists who describe recorded sound collections choose from a bewildering array of descriptive options. Using metadata schemas and standards such as, but not limited to, *RDA: Resource Description and Access* (RDA) or *Public Broadcasting Core Metadata Dictionary Project* (PBCore), archivists can describe a recording based on its format, content, preservation requirements, provenance, and more. Archivists must make decisions about what descriptive standard is best for their respective institutions, weighing additional factors including staff resources and user needs. In many archival repositories, recorded sound materials are included in collections with different kinds of materials, ranging from photographs to correspondence to computer hard drives, so archivists must decide on a descriptive strategy that accommodates this diversity.

DACS is the accepted best practice guide for describing archival collections in the United States and is widely used by archivists in other countries.[1] DACS is intended to apply to all archival materials, "regardless of form or medium" (Society of American Archivists, 2013, p. xvii) and is output-neutral, meaning that archivists may use DACS to create any type of finding aid, from a single MARC record to a multi-page PDF document. Adopted by the Society of American Archivists in 2005, DACS recommends a range of descriptive elements, so the standard is flexible, with only nine required elements for a finding aid to be in compliance: unique identifier, title, creator(s) if known, dates of the materials, extent, conditions governing access, scope and content note, language(s) of the materials in the collection, and the name and location of the repository. This flexibility is beneficial, given the unique nature of archival collections, but since the standard gives archivists wide descriptive latitude beyond the nine required elements, it makes uniformity in application more challenging.

Standardization of archival description is important because it allows archivists to leverage digital technology that facilitates easier collections administration and that improves online access to collections through machine-readable finding aids. Since 1996, Encoded Archival Description (EAD) has been the standard document type declaration in the U.S. for encoding machine-readable finding aids. DACS was developed, in part, to normalize archival description such that machine-readable finding aids, including those encoded using EAD, could be shared online more easily.[2] This machine-readability advances user discovery of archival collections via the Internet and as a result, enables increased and widespread access to archives, one of the primary goals of any archival program. Because consistent markup of similarly structured documents is critical to processing them electronically, creating EAD finding aids that comply with a content standard such as DACS is essential. The fundamental idea behind DACS is to improve access to and administration of archival collections through standardized practice.

Although the rules in DACS apply to all archival materials, the standard recognizes that specialized description may be necessary for some archival collections and recommends other descriptive frameworks as needed. These are detailed in DACS' Appendix B, where the standard recommends using *The IASA Cataloging Rules* or the *Oral History Cataloging Manual* for description of sound recordings (Society of American Archivists, 2013, p. 142). IASA's

1 This study is based on the last edition of DACS published by the Society of American Archivists (SAA) in 2013 with revisions from March 2015. Newer revisions that do not affect the outcomes of this study are available on Github, where SAA's Technical Subcommittee on DACS began maintaining the current version of the standard with all new revisions in 2015. DACS was put on a constant revision cycle in 2012, but no new complete editions have been published since 2013.

2 For more background on DACS' development, see Hensen et al. (2011).

"Preliminary Notes" chapter, on the scope of its *Cataloging Rule*s, provides a good summary of its contents:

> The *IASA Cataloging Rules* specify requirements for the description and identification of sound recordings and related audiovisual media…They are designed for use…in the preparation of cataloguing records and as a standard for the exchange of bibliographic information (IASA, 1999).

As indicated by its title, the *Oral History Cataloging Manual* provides rules for archival cataloging of oral history recordings, which are outside the scope of this study. Even so, there are obvious similarities between description of oral history recordings and other kinds of sound recordings, as characteristics such as format and duration are not content-dependent, so the *Manual* and IASA's *Rules* have many parallel requirements and recommendations. Also, both borrow freely from and are meant to align with *Anglo-American Cataloging Rules, Second Edition* (AACR2), which is another reason for their similarity, so although this study does not examine description of oral history recordings, many of its findings may be also be relevant in an oral history context.

DACS' recommendation of both the *Oral History Cataloging Manual* and IASA's *Rules* is problematic. As both are based on AACR2—an obsolete standard since RDA supplanted AACR2 in 2010—following their instructions means that the resultant description is unlikely to represent current practices since RDA's rules differ from those of AACR2.[3] Also, cataloging at the item level using a bibliographic approach de-emphasizes how the materials were created or collected and how they were ordered originally, both of which are essential in an archival context and emphasized in DACS. Compounding this, DACS provides little information about how to bring together the alternate standards recommended for sound recordings within a DACS-compliant finding aid. The loose directive to follow cataloging rules in archival description leaves the application of these rules open for wide interpretation, which can negatively impact standardization of description.

The granularity of description for music sound recordings is another issue because the appropriate level of description is dependent on the situation and reflects many factors: the contents of the collection, user needs, repository resources, extent of backlog, significance of materials, etc. Item-level description generally provides the most comprehensive access to sound recordings but is time-consuming, and given that many repositories face large processing backlogs, spending time on item-level description means that other collections remain inaccessible. However, describing sound recordings in bulk eliminates many descriptive details users find helpful or necessary, even if a finding aid author compiles detailed index terms and names for inclusion in the finding aid. When less granular description is appropriate and item-level cataloging is unwarranted, for example when processing a collection using "More Product Less Process" (MPLP) (Greene and Meissner, 2005), adapting item-level cataloging standards to a collection-level finding aid according to DACS and IASA's *Rules* can be difficult. Neither DACS nor IASA's *Rules* provides guidance on how to make decisions about the granularity of description for music sound recordings, so archivists must make these decisions based on local priorities, policies, and other considerations.

3 Paradis (2010) provides a full discussion of the difference between AACR2 and RDA for music materials, including sound recordings and how description of both the recorded content and its carrier differ using the newer RDA.

The rules in the *Oral History Cataloging Manual* provide for different types and levels of oral history description and the relationships between them (i.e., oral history collections, projects, and individual interviews), but IASA's *Rules* focus primarily on cataloging items as opposed to collections and the context of materials, with a couple exceptions. There is brief discussion of collective description above the item level in Chapter 9 and an appendix that recommends following outdated standards or versions of standards for archival description including *ISAD(G): General International Standard Archival Description*, *Rules for Archival Description*, as well as *Archives, Personal Papers, and Manuscripts: A Cataloging Manual for Archival Repositories, Historical Societies and Manuscript Libraries* (AAPM), a predecessor to DACS published initially by the Library of Congress in 1983 that is now obsolete. Since AAPM has been superseded by DACS, this recommendation is somewhat problematic.

Describing music, which is a temporal and often non-lingual form of expression, comes with additional challenges. Instrumentation, form, genre, mood, tempo, and other musical features are critical to understanding and identifying music, and while IASA's *Rules* allow for description of some of these, using DACS to determine whether genre and instrumentation should be included in a scope and content note or in some other descriptive element is unclear. Moreover, characteristics such as mood are often meaningful only in specific cultural contexts, so considering all potential users and describing the context accordingly often becomes impractical, if not impossible. Even beyond specific musical characteristics, music sound recordings offer additional descriptive problems. Following the guidelines in DACS alongside IASA's *Rules* when describing sound recordings of music is difficult because DACS aligns more easily with paper-based archival records, while IASA's *Rules* were developed to cover all types of audiovisual recordings.[4] Music sound recordings come in a wide variety of formats, and determining what features to describe depends on a number of factors. The multi-generational nature of audio preservation means that archivists must also frequently wrangle description for multiple copies of the same recording and connect digitized surrogates to the original recording.[5] Identifying a creator for music recordings according to DACS and IASA's *Rules* can be problematic because the circumstances of a recording's creation and acquisition by an archive involves many people—the musician(s), the composer(s), the arranger(s), the person who owned the recording, etc. Describing titles of music sound recordings can also be tricky: some recordings feature one song, while others contain multiple pieces of music as part of a separately titled album. If a recording is unlabeled, the archivist may identify the recording using aural clues, but DACS and IASA's *Rules* conflict on how best to devise a title for unidentified material. DACS suggests using a name segment, indicating the nature of the archival unit, and providing topical information when available. IASA's *Rules* give options ranging from using the term "unedited" for unvariegated production audio to supplying a devised title in brackets, which DACS generally discourages. In short, an attempt to follow DACS recommendations by incorporating IASA's *Rules* can be extremely difficult.

4 See Schwartz (2002) for related critical discussion regarding the similarly problematic relationship between archival description of textual records and the bibliographic classification of photographic images.

5 One area that warrants further study is how better to connect metadata for digital surrogates with archival description.

Given the complicated nature of archival description of music sound recordings according to DACS and the various standards recommended in the literature, this study evaluates and uses document analysis of 20 online finding aids to examine how DACS has been applied and seeks to explore the following questions:

- To what extent do finding aids for music collections with sound recordings follow DACS?
- What are the most common ways in which they are non-compliant at the finding aid level?
- What are the most common ways in which they are non-compliant in more granular description of music sound recordings?
- Do finding aids use IASA's *Cataloging Rules* to describe sound recordings of music, since this is the recommended external standard for doing so?

Literature Review

To date, no studies have evaluated to what extent and how DACS has been implemented in the archival description of sound recordings. However, a number of authors have touched on archival description of sound recordings in music archives and written about the challenges of DACS implementation. There are also several recent guides and manuals for description of sound recordings that provide instructions using alternative standards separate from DACS and IASA's *Rules*.

As far as research on music archives, Lisa Hooper's study on music libraries with archival holdings (2011) and her book with Donald Force (2014) both deal with archival description of music materials, including sound recordings. In her 2011 article, "Moving to Preserve the Past: Current State of Archival Music Collections and Future Possibilities," Hooper presents the results of a survey of music librarians with questions about "hidden" archival collections in music libraries and how they are managed and made accessible, including an overview of descriptive practices. Although she demonstrates that local convention is used more frequently than "archival standards" to describe collections, including those with sound recordings, she recognizes the need for further study of "the processing standards … for music archival collections," (2011, p. 26). Since description is an important part of archival processing, evaluating DACS compliance of finding aids for archival collections with music recordings helps address the need Hooper identifies. Her more recent book with Donald Force, *Keeping Time: An Introduction to Archival Best Practices for Music Librarians* (2014) touches specifically on description of sound recordings, but in the context of metadata created during digitization, as opposed to archival description in finding aids. As an introductory manual, the book provides an overview of many considerations involved in administering an archives and may be useful for readers who are less familiar with archival practice as they make decisions about how best to describe sound recordings.

DACS encourages readers to use the "most recent edition" of standards other than DACS "where further guidance is needed" (p. 141), and although IASA's *Rules* and the *Oral History Cataloging Manual* are based on the obsolete AACR2, several authors provide useful guidance on following RDA in descriptions of sound recordings. DACS includes a crosswalk to RDA (pp. 150-153), so these bibliographic guidelines could be used to create RDA-compliant descriptions. Since 1989, Richard Smiraglia has published four editions of his classic cataloging manual, *Describing Music Materials*, in various iterations. The most recent edition (Smiraglia and Beak, 2017) addresses RDA but unfortunately eliminates the discussion of archival description that was included in earlier editions, which was based on the now obsolete *Archives, Personal Papers, and Manuscripts: A Cataloging Manual for Archival Repositories, Historical Societies*

and Manuscript Libraries (Hensen, 1983 and 1989). In 2015 the Music Library Association published its report *Best Practices for Music Cataloging Using RDA and MARC 21*, with updated information about bibliographic description of sound recordings. Because the rules in RDA and AACR2 differ for cataloging music materials, these guidelines do not fully align with those in IASA's *Rules*, but instead they give helpful information about application of RDA.

Other authors have considered issues related to description of music sound recordings and how best to support user needs, one of the goals of standardized description. Although she focuses on libraries, C. Rockelle Strader's detailed history of cataloging music sound recordings in the United States (2015) highlights many issues that are also common in archival description, such as the extent to which the musical content should be described as opposed to its carrier. Similarly, Suzanne Mudge and D.J. Hoek (2000) present a number of considerations and recommendations for the library cataloging of 78 rpm sound discs of popular music, recognizing that MARC "cataloging rules generally offer little guidance for describing and providing access to 78 rpm discs" (p. 2). In Delaina Sepko's 2013 study on archival description of popular music, she considers the meaning of music genre and its relationship to the detailed guidelines for sound recordings in *Rules for Archival Description* (RAD), the Canadian equivalent to DACS. RAD devotes an entire chapter to description of archival sound recordings, and Sepko evaluates its strengths and weaknesses. She finds the standard's treatment of genre to be limited and suggests that music genre should be described in a finding aid's scope and content note. Although Sepko is looking at a different standard using different criteria, her study demonstrates that description of archival music recordings can be challenging, and her recommendation for including information about genre in a scope and content note could easily be applied in a DACS-compliant finding aid.

Several case studies on DACS implementation projects (Rush et al., 2008) focus on how repositories have adapted existing descriptive practice to accommodate DACS rules, and some of the issues that emerged were common to finding aids in this study Two of the repositories had previously adopted Steven Hensen's *Archives, Personal Papers, and Manuscripts* as a descriptive standard, and all three were using MARC records to describe archival collections before they implemented DACS. Two of the archives were also implementing EAD finding aids at the same time as DACS, and one of the case studies documents how a moving image repository integrated PBCore metadata with DACS collection-level description in an existing library system with MARC records. The case studies found that legacy practice—especially in relationship to the use of abbreviations and the "access," "date," and "languages and scripts of the material" elements—required changes to existing finding aids for DACS compliance. The repositories also found DACS to be flexible and easy to implement, and despite the incumbent changes that came with adopting a new standard, the repositories benefited from being able to use DACS alongside MARC records, EAD finding aids, and other descriptive metadata schemas. Although these studies were unrelated to archival description of sound recordings, their findings align well with the results of this study, as discussed below.

A number of recent guides to archival description of sound recordings present various standards with which to describe archival sound recordings. In the *ARSC Guide to Audio Preservation* (2015), Marsha Maguire's comprehensive chapter on description of audio recordings provides information about both library and archival options for description, but she does not recognize that DACS recommends the use of IASA's *Rules*. She writes, "At present, there are no DACS-compatible content standards or guidelines for describing unpublished sound recordings" (Brylawski et al., 2015, p. 96). Then she suggests that readers apply rules from AACR2, RDA, or PBCore in formulating description beyond title, date, and shelf location, for which DACS provides sufficient guidance in most cases (Brylawski

et al., 2015, p. 96). According to Maguire these other standards work well for description of published or unpublished sound recordings, and she implies that bibliographic cataloging fills some of the gaps in DACS, especially related to technical and preservation metadata for sound recordings. Finally, Megan McShea's *Guidelines for Processing Collections with Audiovisual Materials* (2015), created for the Smithsonian Institution's Archives of American Art, provides the framework used at the Archives for preparing finding aids using the software Archivists' Toolkit, including their descriptive standards. Even though McShea's *Guidelines* are intended to standardize institutional practice according to DACS and EAD, her best practice recommendations were published online to serve as a guide for other institutions and could easily be applied in other repositories, as she provides explicit rules for description of sound recordings according to DACS.

Methodology

To identify finding aids for the study, I used purposive sampling. First I compiled a list of all institutions (n=256) with members in SAA's Performing Arts Section, the Association for Recorded Sound Collections, and the Music Library Association's Archives and Special Collections Committee. I reasoned that these would be repositories where I would be able to identify finding aids for music collections. Next, I randomized the list and used the first twenty organizations in my search for finding aids in order to improve the potential reliability of the results, but because this study is qualitative and exploratory, they provide only a sample of the full range of descriptive practice.

I visited the websites of the repositories and searched for the word "music" using the search tools available on each. I then scanned the finding aids that populated the search results, especially the scope and content notes, biographical and historical notes, and series listings, to evaluate the extent to which the collections included music materials. I was looking for collections with finding aids that met the following criteria:

- The finding aid was created in 2005 or later, after DACS was first published, and
- The collection documents the musical activity of its creator or is comprised primarily of music materials (i.e., one series or sub-series devoted to music materials, as applicable). I define music materials as notated music or sound recordings of music. I excluded collections with a strong focus on non-musical activities.[6]

After I started looking for finding aids from my sample set of 20 repositories, I determined that many of the institutions—eight total—were not suitable for inclusion in the study, either because they had no online finding aids and/or discernable music collections. I defined finding aid loosely so I could explore the full range of descriptive practice. At minimum, a finding aid had to name the collection and provide some sort of collection-level description to be included in the study.

Once I confirmed a finding aid was suitable for inclusion, I listed the name of the collection and the finding aid URL by repository in order of the search results. Then I randomized these lists to avoid potential bias based on the search algorithm of each repository's online search tools. For the repositories with finding aids that met my criteria (n=160), I analyzed the first three in the randomized list for every repository. Some repositories had well over three finding aids that met my criteria, but the only exception was San Jose State University,

6 This sampling strategy, set of repositories, and associated finding aids were also used in a forthcoming study about the characteristics of music described in finding aids for collections with notated music, sound recordings, or both.

which had only two relevant finding aids. Finally, I eliminated finding aids that contained only description of notated music. In total, I analyzed 20 finding aids from 11 repositories for collections that ranged in size from 1 to 55 linear feet (Table 1). All of the sampling and data collection was completed in 2016.

(Table 1) Repositories and collections included in the study

Name of the home institution	Name of the collection	Type(s) of music materials described	Multi- or Single-level
Bowling Green State University	Joel Rudinger Papers	sound recordings	Multi
Bowling Green State University	Steve Allen Collection	sound recordings	Multi
Bowling Green State University	Ray B. Browne Collection	sound recordings and notated music	Multi
Case Western Reserve University	Donald Erb papers	sound recordings and notated music	Multi
Case Western Reserve University	Maurice Goldman Papers	sound recordings and notated music	Multi
Cornell University	Adler hip hop archive	sound recordings	Multi
Cornell University	Black Metal Music collection	sound recordings	Multi
Cornell University	Breakbeat Lenny Archive	sound recordings	Multi
Emerson College	Warren Debenham Comedy Sound Collection	sound recordings	Multi
Great American Songbook Archives and Library	Margaret Sauter Sheet Music Collection	sound recordings and notated music	Multi
Kansas Historical Society	William E. Koch Collection	sound recordings	Single
San Jose State University	San Jose State College Songs and Music Collection	sound recordings and notated music	Multi
State University of New York at Potsdam	Allen L. Richardson Papers	sound recordings and notated music	Multi

Name of the home institution	Name of the collection	Type(s) of music materials described	Multi- or Single-level
State University of New York at Potsdam	Mary E. English papers	sound recordings	Multi
State University of New York at Potsdam	Paul A. Steinberg papers	sound recordings and notated music	Multi
Texas Tech University	Box Family [sic]	sound recordings and notated music	Single
University of Iowa	Lynda Mendoza Collection of David McCallum Memorabilia	sound recordings and notated music	Multi
University of Iowa	Philip Greeley Clapp Papers	sound recordings and notated music	Multi
University of Iowa	Wilferd Kracht and Vincent C. Brann Papers	sound recordings and notated music	Multi
University of Miami	Ramón S. Sabat Panart Collection	sound recordings	Single

Once I identified the finding aids, I used two approaches to gather and evaluate my data.[7] First, I determined if the finding aid met the minimum requirements in DACS, including whether all the required elements were present and in compliance. Next, I focused more specifically on the description of sound recordings in each finding aid, evaluating whether the content followed DACS and IASA guidelines. This two-pronged approach provided both a collection-level and more granular perspective on DACS compliance based on its requirements and its recommendations.

To evaluate overall DACS compliance, I made an electronic form to gather data (Appendix 1). Using the form, I indicated whether the required elements were present and if so, marked whether the element was formulated according to DACS rules. With the exception of the name and location of the repository and unique identifier, all of the required elements in DACS can include information about music sound recordings, so checking the application of these fundamental requirements, while a relatively blunt measure, helped me consider the quality of descriptive practice represented by the finding aids in the sample. Related to this, I also recorded whether the finding aids were single- or multi-level because DACS requirements vary accordingly. The multi-level finding aids included a box or container list or a more detailed inventory of the contents of the collection. My sample included 17 multi-level and three single-level finding aids. This part of the study looked overall at music collections, including those comprised of sound recordings only and a mix of sound recordings and notated music.

7 A similar methodology may be found in Park and Maszaros's evaluation of the quality of MODS records in digital repositories (2009).

To focus more specifically on description of sound recordings, for each collection I transcribed verbatim in a spreadsheet any description of music sound recordings in the finding aid (see Table 2, Example spreadsheet for Mary E. English papers, 1930-2005). I also indicated the type(s) of described materials (i.e., sound recordings or sound recordings and notated music), and evaluated the extent to which the description was DACS-compliant. Given the inherent flexibility of DACS, compliant descriptions ranged considerably in structure, content, and extent. A compliant description could be as simple as "The collection includes jazz sound recordings," or as complicated as "Series 3 includes 12 sound discs (CD) published between 1992 and 1998 featuring avant-garde jazz by San Francisco Bay Area-based performers, including Vijay Iyer." I copied into individual spreadsheet cells the discrete units of relevant descriptive information—dates, folder titles, scope and content notes, collection abstracts, and so on. DACS contains guidelines for twenty-five elements, so I copied text that would be equivalent to these, but only the text that specifically described music sound recordings. Although some finding aids labeled the elements differently than DACS, the descriptive units were easy to identify based on the formatting of the finding aid. I made a note in the spreadsheet both of the applicable DACS element names and the terminology used in the finding aid when it differed. This data was gathered to determine whether the description followed the instructions contained in DACS for that particular element (e.g., creator) or combination of elements (e.g., title and date presented as one descriptive unit). In total, I transcribed and analyzed for DACS compliance 379 data units that described sound recordings from the 20 finding aids in my sample.

(Table 2) Example spreadsheet for Mary E. English papers, 1930-2005

Finding Aid Element	Name if different	Type	Text	DACS	Code	Code
Title (item-level) with date	Item level description	Sound recordings	Massachusetts Music Educators Association Vinyl Record Album, 1961	No	Capitalization	Not IASA
Title (item-level) with date	Item level description	Sound recordings	9 Unidentified Cassette Tapes (3 lecture, 6 music), undated	No	Capitalization	Not IASA

For descriptive units I transcribed that did not follow DACS, I iteratively developed a set of codes to categorize in what way(s) the description varied. The codes were not developed in relationship to a specified element, set of elements, or level of granularity. Instead, to develop the codes, I recorded a brief, natural language description of the manner in which the description did not follow DACS, and then compared across collections to look for similarities in my notes. Seven common issues emerged, which comprise the codes I then applied retroactively to all of the descriptive units (Table 3). Finally, I compared the frequency of codes across collections to find the most common ways in which description did not follow DACS.

(Table 3) DACS compliance codes

Code:	Description of Code:
Not descriptive enough	Applied when description is insufficient or unclear. (e.g., title uses "collection" or "archives" as opposed to "papers and sound recordings")
Date format incorrect	Applied when dates were not formatted according to DACS
Mixed elements	Applied when multiple elements were included as one. (e.g., arrangement note is part of scope and content note or playback speed of recording is included in an item-level title instead of a separate physical access element)
Not IASA	Applied when description did not follow *IASA Cataloging Rules*, which is the DACS companion standard for music sound recordings
Missing date	Applied when no date information was supplied
Abbreviation	Applied when abbreviations were used, as DACS discourages the use of abbreviations
Capitalization	Applied when DACS capitalization rules were not followed

Results

Sound recording description DACS compliance

Looking at the extent to which the specific description of sound recordings follows DACS, the level of compliance is relatively low. No finding aid contained 100% DACS-compliant description of music sound recordings. In fact, only three of the finding aids had description that was 80% compliant or higher, with two of these being from the same repository, while six finding aids from five repositories had no description whatsoever that was compliant. I analyzed the descriptions from each collection (n=20) separately so that the relative sizes of the collections would not skew the results and ranked the codes according to their frequency for each collection. I then compared across collections to see what codes occurred most regularly overall.

Three finding aids had more than one primary reason for noncompliance, with the same frequency of occurrence for each reason, but one of these was also more common in other finding aids— not following *IASA Cataloging Rules*—with nine finding aids total (45%) displaying this issue more than the others. Although this was not the most common error for every finding aid, all repositories but one had finding aids with at least one occurrence of this issue. One common example of this error is when finding aid authors use incorrect terminology to describe the physical format of sound recordings, such as "vinyl LP" as opposed to "sound disc : analog, 33 1/3 rpm." The second-most common issues were mixed elements and incorrectly formatted dates, with six finding aids (30%) each respectively represented in these categories. An example of a "mixed elements" error is in the following excerpt from one collection's scope and content note, in which the finding aid author has inserted information better suited for a separate "physical access" element:

> Reel to reel audio recordings probably made in the 1950's primarily for Browne's Alabama folk lyric research have become too brittle to be accessible. Cassette audio recordings document mostly sessions from popular culture conferences and interviews with Ray Browne and others in the field (Honneffer, 2007).

Only three finding aids (15%) had "missing date" as the most common error, while both capitalization errors and description that was insufficient were the most common errors for only one finding aid each.

Finding aid DACS compliance

Single-level finding aids

The three single-level finding aids all came from different repositories, and none included all the required elements. As indicated above, required elements for both single- and multi-level finding aids include a unique identifier and a title for the collection, an indication of the collection's creator(s), dates of the materials, extent statement, description of conditions governing access, scope and content note, language(s) of the materials in the collection, and the name and location of the repository. All three finding aids were missing any mention of conditions governing access. Two were missing information about the language(s) of the materials, and one was additionally missing both a unique identifier and an extent statement. This last finding aid was particularly deficient, in that the only information provided about the creator was in the name segment of the collection's title, as opposed to a separately identified element for creator or clear statement on the creator's identity. Further, the date(s) of the materials were unclear, as they could only be inferred from the dates mentioned in the biographical note.

DACS compliance issues in the other two single-level finding aids included dates that were incorrectly formulated as well as titles that were not sufficiently descriptive. DACS specifies the use of the word "collection" only when a collection has a topical or format-specific focus and recommends naming the primary forms of the materials in the title instead of a generic word such as "collection." For example, The William E. Koch Collection includes professional papers and sound recordings related to Koch's work as a folklorist, so the title "William E. Koch papers and sound recordings" would comply better with DACS and be more descriptive.

Multi-level finding aids

Multi-level finding aids in the study (n=17) tended to be better in terms of containing the prescribed elements and following DACS guidelines, with six finding aids complete according to DACS. It requires multi-level finding aids to include all of the same elements as single-level finding aids and to provide an indication of the relationship between different levels of the collection (e.g., an arrangement note). DACS also requires the identification of any new creators of materials at lower levels, should these entities differ from the creator(s) identified at the collection level.

Looking at both completeness and compliance, four of the multi-level finding aids fully adhered to DACS. Others came close. One multi-level finding aid was complete but non-compliant in only one way, while three others were missing one element, but were complete and in compliance otherwise. As with single-level finding aids, multi-level finding aids frequently did not

include the language element, with 53% of multi-level finding aids leaving out any description of the language(s) or scripts of the materials. Although no other error occurred as commonly as omission of the language element, three of the multi-level finding aids did not name new creators at lower levels of the descriptive hierarchy, even though the materials being described were by a different creator than the one(s) named at higher levels of description. Finally, the element "conditions governing access" was missing from two of the multi-level finding aids.

Failure to name new creators at lower levels of the finding aid's descriptive hierarchy could be connected to music-related descriptive issues or to a finding aid author's determination that the creator named at a higher level suffices to satisfy the requirements in DACS. They state, "At subsequent levels of a multilevel description, this element [name of creator(s)] is required only if the person(s) or organization(s) responsible for the creation or accumulation of the material at the subsequent level differs from the higher level(s)" (Society of American Archivists, 2013, p. 10). DACS also allows for identification of new creators in title elements, so the decision whether and how to name a new creator presents a number of descriptive options. Although one weakness of document analysis as a methodology is that it does not explain why certain descriptive practices occur more commonly than others, the possibility that music recordings often involve complicated relationships between creators, compilers, and the materials being described could explain why several finding aids did not name new creators at lower descriptive levels. For example, the Lynda Mendoza Collection of David McCallum Memorabilia includes a series of audiovisual recordings with item level description and fourteen subseries, some of which are arranged according to a specific creator and some of which are arranged based on format or content. Ultimately, the collection-level identification of Lynda Mendoza as the collection's creator trickles down to the granular item-level description in the audiovisual series, so technically, the finding aid remains in compliance with DACS requirements for creator. However, the description is inconsistent between sub-series and even between items. Some name individuals and organizations responsible for the creation of the item being described (i.e., publisher, performer, composer, etc.), while some do not. The finding aid does not provide a clear explanation for these differences or identify the full relationship between the names listed and their role in creating the items. As a result, the range of creators and the fact that some of the recordings do not have any new creator information supplied makes this part of the finding aid and its arrangement unclear.

Looking at multi- and single-level finding aids together, only 24% of the finding aids I evaluated were complete and contained no errors according to DACS requirements. Both single- and multi-level finding aids demonstrated problems with the language and "conditions governing access" elements, but as mentioned above, document analysis is insufficient for determining the cause for these mistakes. Even so, they are probably less likely to be associated with music-related descriptive issues, as application of DACS to music materials for these elements is straightforward. For the element "conditions governing access," DACS requires confirmation or otherwise that a collection is open for use without restrictions related to the nature of the information in its materials, per institutional, statutory, or donor requirements. Rights-related access restrictions and restrictions due to physical format and condition are included under different elements that are not required by DACS. These kinds of restrictions are more likely to impact music sound recordings than an institutional or statutory requirement, as rights-related restrictions and legacy media formats would more frequently cause access restrictions in relationship to music as opposed to what DACS includes under the "conditions governing access" element. In regards to language of the materials, even collections comprised entirely of recorded instrumental music are likely to feature writing on the recording or storage containers, and DACS requires that archivists describe this language.

One possible reason to explain these errors is failure to update legacy descriptive practices to adhere to DACS. In Prudence Backman's discussion of applying DACS at the New York State Archives (Rush et al., 2008), she identifies legacy practices at the Archives that did not comply with DACS—specifically, omitting mention of access conditions when there were no restrictions and omitting description of language, unless a collection was not in English. These practices may be common at other repositories and might explain why finding aids in this study omitted the language element and often did not include the "conditions governing access" element.

Conclusion

Looking broadly at archival description of music materials, whether a finding aid follows DACS requirements does not seem generally to be connected to the unique qualities of archival music materials, with the possible exception of multi-level finding aids failing to identify creators at lower descriptive levels. More research is needed to determine the reason(s) for this noncompliance to improve descriptive practice and address the underlying cause(s). . The most commonly missing required element was description of the language(s) and script(s) of the materials. Even so, since DACS provides clear guidance on how to describe language(s) and script(s) in a way that applies unambiguously to music sound recordings, it is unlikely that the complicated nature of music sound recording description explains the absence of this element in non-compliant finding aids. Alongside this, the problem of "mixed elements" and incorrectly formatted dates might indicate that there is a need for additional training for finding aid authors in the application of DACS. These issues may also be due to the display settings in a repository's finding aid web delivery platform, as the underlying description could very well be DACS-compliant but delivered through a website that changes the date formatting or merges information from multiple elements under a new heading, for instance.

Closer analysis shows that the finding aids in this study regularly do not follow IASA guidelines when specifically describing sound recordings, as recommended by DACS. Given these guidelines are meant to clarify descriptive practice for this format, the prevalence of this issue in finding aids suggests the need for clearer direction in how to describe the unique characteristics of sound recordings in a way that complies with DACS. Until improved guidance is available, archivists may well choose to describe archival sound recordings of music using a standard other than DACS, as more specific and up-to-date guidance is available in RDA, *Rules for Archival Description*, and PBCore, for example. Using another standard in conjunction with DACS and applying it consistently could help address the DACS-compliance issues identified in this study. Ultimately, archivists must decide what descriptive practice would be best, balancing the resources of their repositories with the needs of their current and future users.

The initial results of this study were presented at the 2016 Society of American Archivist's Research Forum in the paper, "Discord in Archival Description? Evaluating DACS Compliance and Best Practices through Document Analysis of Finding Aids for Music Materials." SAA Annual Meeting. Portland, Oregon. August 2, 2016. The study was designed as part of the 2014 Institute for Research Design in Librarianship, with special thanks to my colleague Emily.

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Appendix 1: Sharing Notes Form for Finding Aid Level DACS Compliance

Q1 Name of the home institution:

Q2 Name of the collection:

Q3 Multi- or single-level description?

Q4 Single-level Finding Aids

- ☐ conditions governing access
- ☐ creator (if known)
- ☐ date
- ☐ extent
- ☐ ID
- ☐ language
- ☐ name/location of repository
- ☐ scope and content note
- ☐ title

Q5 Multi-level Finding Aids

- ☐ arrangement note/whole-part relationship/container list
- ☐ conditions governing access
- ☐ creator (if known)
- ☐ date
- ☐ extent
- ☐ ID
- ☐ language
- ☐ name/location of repository
- ☐ title
- ☐ new creators named in lower levels

Moving Image User-Generated Description: A Matter of Time

Edward A. Benoit, School of Library & Information Studies, Louisiana State University, USA

Abstract: This article explores temporal influences on compressive social tagging generation for archival moving image materials through a quasi-experimental study. Forty participants tagged the same video segmented into differing lengths. Analysis of the resulting data found the average number of user-generated tags is influenced by the length of the video within moving image collections. Specifically, the average tagging rate for a short video was higher than its lengthier counterpart.

"The younger public now thinks of moving image archives as a kaleidoscopic online collection where access is replaced by automatic ingest and metadata by user-generated tags" (Prelinger, 2007).

Over the past decade, archivists began experimenting with user-generated description through social tags and commenting. Social annotation became the trend de jure and it was promoted as a method for increasing access and democratizing the archive while many repositories used them to broaden description of photographic and textual records. While the popularity of tagging grew both inside and outside archives, early archival studies focused more on their use in textual and photographic collections than on moving image materials.

The following article reports the first in a series of studies that isolate specific variables unique to moving image materials. The results of these studies will develop a broad set of best practices for integration of social tags within moving image archival collections based on empirical data. Furthermore, each study highlights strengths and weaknesses of the participatory model. This first study explores the following research question and hypothesis:

RQ1: What effect does video length have on user-generated tags?
H_1: Users produce tags at a higher average rate for shorter videos than longer videos.

Literature Review

Although its origins include older analog models, participatory archives became popularized within the archival literature in parallel with the Web 2.0 and Archives 2.0 movements in the mid-2000s. According to Eveleigh (2017), "'Participatory archives' is one of a number of shorthand phrases used in the archival literature in reference to contemporary initiatives, which seek to engage non-archivists—generally through the medium of social Web technology—either to contribute to archives or to comment on archival practice." Early studies highlighted the participatory archives' broad potential for increasing access, pluralizing the archival voice, and engaging with the public in new and innovative methods.[1] Archivists began exploring these possibilities through early projects, such as the Polar Bear Expedition Finding Aid (Krause and Yakel, 2007; Yakel, 2006). Subsequently, new models of user-repository interaction were developed to further the participatory idea. Anderson and Allen (2009), for example, developed and promoted an archival commons framework, and Evans (2007) suggested leveraging participatory techniques to ease archives' growing fiscal concerns. Additionally, archivists further implemented participatory strategies for arrangement, description, transcription, outreach, and acquisition as individual case studies (Boyer, Cheetham and Johnson, 2011; Samouelian, 2009; and Theimer, 2011b). Finally, considering

1 For more detailed and broader reviews of participatory archives, see Eveleigh, 2017; Flinn, 2010; Oomen and Aroyo, 2011; Theimer, 2011a; and Theimer 2011b.

moving image materials, the participatory research focused on transcription and community outreach, in addition to tagging.

As part of the movement's universe, social tagging emerged as an early magnet testing the waters. Social tags are user-generated terms, keywords, or descriptions created for either the user's own organizational purposes or to share with others. As Guy and Tonkin (2006) note:

> In essence, a tag is simply a freely chosen set of textual keywords. However, because tags are not created by information specialists, they do not at present follow any ubiquitous formal guidelines. This means that items can be categorised with any word that defines a relationship between the online resource and a concept in the user's mind. Any number of words might be chosen, some of which are obvious representations, others making less sense outside the tag author's context.

The collection of tags within a particular system creates a folksonomy of non-formal object description. Although some minor differences exist between the terms social tagging, user-generated description, and crowdsourced description, the phrases are used interchangeably within this article.

These initial studies (and the majority to follow), however, focused on still images and textual archival records—with only a handful exploring tagging's use with moving image materials. The Library of Congress Flickr and the Steve.Museum projects represent the two most extensive studies to date, and each focused on still images (photographs and fine art) (Springer et al., 2008; Trant, 2006; Trant, 2009a; Trant, 2009b; Trant, 2009c; Bearman and Trant, 2005). Additional smaller studies explored the types of tags created on popular bookmarking sites, such as Del.ic.ous and discussed their use for personal and professional organization (Kipp and Campbell, 2006l Kipp, 2008; Hunter, 2009). More recently, Benoit investigated the potential using domain expert user-generated tags as a replacement for item-level metadata within a minimally processed digital archives for a collection of photographs and textual documents (Benoit, 2017; Benoit, 2018).

Although only a handful of studies explore the use of social tagging within moving image archives, their findings indicate significant potential (Mellenhorst, Grootveld, and Veenstra, 2008). The development of moving image specific studies follows a similar pattern to their still image counterparts. Kevin Andreano (2007) recognized the potential benefits of user-generated metadata early in the movement. He highlighted the existing commercial use of crowdsourced description moving image sites such as YouTube and the Internet Archive and argued for archivists to consider similar adaptations. Andreano did not merely proselytize the benefits of social tagging; he also recognized their potential flaws and limitations. In discussing the Internet Archive, he notes, "[the] inability to provide any metadata other than content description," the possibility for "flawed" or "misleading" information, and the lack of formalized controlled vocabulary (Andreano, 2007). Despite these concerns, Andreano encourages moving image archives to consider using user-generated description as a tool, noting "User-created metadata cannot provide the functionality of more standardized cataloging practices, but it does have some advantages of its own, such as catering to the natural language of users through folksonomy, and presenting the possibility of serendipitous discovery. It is also a relatively cheap and easy way for archives to provide content description" (Andreano, 2007).

Allied disciplinary studies, such as those in computer science and information science, initiated most of the early moving image studies with an emphasis on understanding the retrieval role of user-generated comments and tags within online video hosting services, such as YouTube (Madden, Ruthven, and McMenemy, 2013; Jeong, 2008; Jeong, 2009; Huang, Fu, and Chen, 2010; Gedikli and Jannach, 2013; Ames and Naaman, 2007; Bertini et al, 2013). These studies influenced the further development of tagging and description tools, including the *Wasida?* video labeling game (Gligorov et al., 2011; Gligorov, 2012; Hildebrand et al., 2013).

Gamification or games with a purpose (GWAP) were popularized during early citizen science crowdsourcing projects and create a competition style environment to increase both metadata creation and quality. Rather than describing entire videos, the *Wasida?* platform uses time coding to associate each tag with a specific frame in the video (Hildebrand et al., 2013). Initially developed by the Netherlands Institute for Sounds and Vision and the Vrije Universiteit Amsterdam, the *Wasida?* game has also been adapted for fiction movies and analysis of domain expert description (Estranda et al., 2015; Estranda, 2015).

Despite these studies (and others not noted), the application of social tagging approaches for moving image archival materials remains behind its photographic and textual counterparts. The limited number of studies exploring the use of tagging as a comprehensive description tool for moving image materials partially explains this gap. Additionally, moving image materials possess more complex characteristics and therefore more challenges. This study begins addressing the lack of social tagging empirical research focused primarily on moving image archival materials.

Methodology

To address both the research question and the need for empirical data, the research study employed a mixed-methods, quasi-experimental two-group design (Hank and Wildemuth, 2009). This approach limited the potential variables through random group assignment and a sterile interactive online space (Qualtrics). Recruited participants were randomly assigned to one of two groups. Each participant was informed that they would either watch a single 25-minute video or three videos of equal length for a total of 25 minutes. Upon starting to view the video(s), participants could easily tell which group they were placed into based on the video's time counter (displaying either 25 or 8 minutes). Additionally, participants were provided with the following description of tagging in their instructions:

Please create tags/keywords for the video. A tag, if you are unfamiliar with tagging, should provide some description of the video that would help yourself and/or others find it through searching or browsing online. Tags may include any word or combination of words (e.g., you can enter "funny" or "silly video" as individual tags).

Group A watched a 25-minute video and then created tags while Group B watch the same video broken into three segments, and generated tags after each segment. The tagging environment did not include other participant's tags, nor any description, title or metadata associated with the videos. Finally, the study required each participant to create at least one tag per video (or video segment) with no upper limit on the number of tags created. The generated data were analyzed using descriptive statistics, open coding, and cross-sample comparative analysis.

Sample Video(s)

The research study used, "Miss Lucy's Classic Cajun Christmas," a video from the Louisiana Digital Media Archive (LDMA), as its sample.[2] Miss Lucy hosted several specials on Louisiana Public Broadcasting (LPB), and the sample video was selected for the following three reasons: Louisiana themes, video length, and existing metadata. Louisiana themes: Although limiting variables, the research design aimed to emulate some real-world conditions. In this case, the recruitment of local participants would be most interested in a video with local themes. Video length: The broadcast structure of the video follows a segment style construction over 25 minutes. Therefore, the video could easily be sub-divided into three segments of relatively equal length (one 9 minutes, two 8 minute segments). Existing metadata: The research designed aimed to include multiple tag comparison including inter-group and with existing metadata. The LDMA includes rich metadata for its videos including genre, geographic locations, subject terms, contributors, and a narrative description (see Table 1 for the sample video's existing metadata).

Table 1 Sample Video Existing Metadata from LDMA

Field	Data
Collection	LPB
Genre	Holiday special
Place Covered	Lafayette, Lafayette Parish, Louisiana, Natchitoches, Natchitoches Parish, Louisiana, St. James Parish, Louisiana, Breaux Bridge, St. Martin Parish, Louisiana
Copyright Holder:	Louisiana Educational Television Authority
Date Issued	2001-12-01
Duration	00:24:51
Subjects	Zaunbrecher, Lucy Henry, 1938- | Holidays | Christmas | Vermilionville | Acadian Village (Lafayette, La.) | Lasyone's Meat Pie Restaurant | Natchitoches Meat Pie | Natchitoches Christmas Festival | Bonfires on the Levee | Hayes, Hunter, 1991- | PARADES | Christmas lights

2 The LDMA is a joint venture of Louisiana Public Broadcasting (LPB) and the Louisiana State Archives. More information can be found at http://www.ladigitalmedia.org/. http://ladigitalmedia.org/video_v2/asset-detail/LMLCC

Contributors	Zaunbrecher, Lucy Henry *Host* Allen, Gary *Producer* Yancey, Allegra Nevils *Producer* Bailey, Jarad *Photographer* Crews, Keith *Photographer* Mitchum, Steve *Photographer* Woods, Virnado *Photographer* McKenzie, Lucy Suzanne *Guest* Lasyone, Jim *Interviewee* Pellerin, Ray *Interviewee* Angelle, Jennifer *Interviewee*
Description	In this Christmas special from December 1, 2001, Ms. Lucy travels around Louisiana to explore Cajun Christmas traditions. In Lafayette, she visits with Papa Noel at Vermilionville and tours the Christmas lights at Acadian Village with her granddaughter, Lucy Suzanne McKenzie. While in Natchitoches, she eats a traditional Creole Christmas meal with Bobby DeBlieux at the Taunte Houpee' Inn, talks to Jim Lasyone about his Natchitoches meat pies, explores Linda Lou Ropp's collection of Santa figurines at the Laureate House, and attends the Natchitoches Christmas Festival of Lights. Ms. Lucy then visits the Bonfires on the Levees in St. James Parish and attends the Cajun Christmas Bayou Parade along Bayou Teche in Breaux Bridge, including a performance by Hunter Hayes. Lastly, Ms. Lucy reads the "Cajun Night Before Christmas" by Trosclair with illustrations by James Rice.

Participants

Study participants over 18 years old were recruited through social media and flyers around the greater Baton Rouge area. Interested persons accessed the study through a Qualtrics-based online survey, and upon agreeing to the informed consent, were randomly assigned to a study group. Each participant completed a pre-questionnaire with demographic information and was then presented instructions for their assigned group's task. The study remained open until 40 participants successfully completed their assigned task(s). Finally, upon completion, all participants could opt into a random drawing for one of four $50 payments. Most of the sample population were geographically located in Louisiana (65%). The sample was also primarily female (77.5%) and white (77%) with an average age of 30.9 (19-65 range).

Results

Overall, Group A (long video) generated 322 total tags while Group B generated 555 (aggregating all three short videos). This represents a statistically significant difference between the number tags generated for the long video ($M = 16.1$, $SD = 22.6$) and the short videos ($M = 27.75$, $SD = 12.1$); $t(38) = -3.11$, $p = 0.004$. The Group B participants only reused 59 tags between segments (a user reusing the same tag in multiple segments) and produced 281 total unique tags or 50.6% of their tags. Group A created a higher percentage of unique tags (54.3%), but a lower number overall at 175. Finally, a comparison of the unique tags from each group finds 31.7% of unique tags were created by participants in both groups.

In addition to generating a higher total number of tags (both unique and composite), Group B participants were more likely to exceed 20 created tags than Group A. Figure 1 highlights the number of tags created by each Group B participant with 14 exceeding 20 total tags (70%). In comparison, Figure 2 shows only two members of Group A did the same (10%).

As expected, the tagging rate for the short videos declined slightly from video 1 to video 3. Expressed as a percentage of all tags created, Group B participants created 39% for video 1, 34% for video 2, and 27% for video 3.

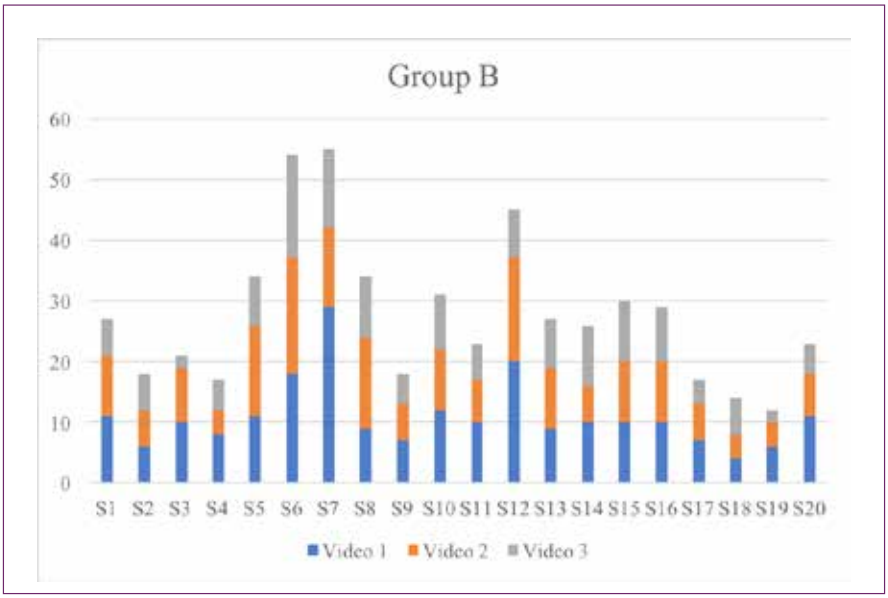

Figure 1 Group B Tagging Rate Per User

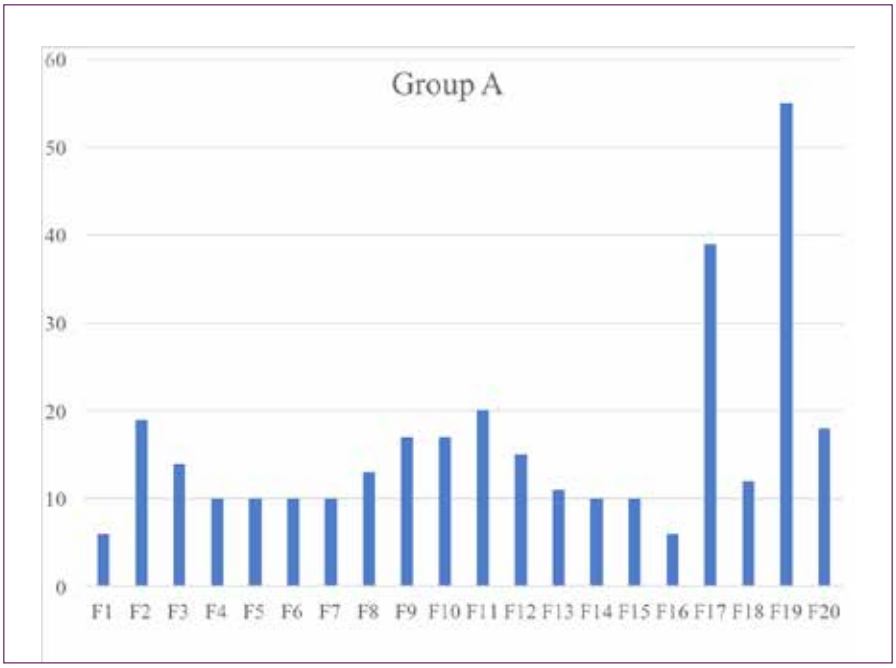

Figure 2 Group A Tagging Rate per User

Although the two groups generated tags at different rates, the types of tags created remained similar. Table 2 compares the most frequent tags for each group with its frequency. Unlike previous studies, the vast majority of tags fell into one of three main types: description, identification, and response. The description tags literarily describe the content of the videos, such as *bedtime stories*, *burning fire*, and *music on the bayou*. While the identification tags also indicate content, they highlight specific persons, places, music, etc.—proper nouns such as *Natchitoches*, *Ms. Lucy*, and *We Wish You a Merry Christmas*. The final main category of tags reflects emotional responses to the video(s) themselves, such as *funny*, *educational*, and *joyful*. As noted in Table 3, the proportion of tags within each category followed a similar pattern for both groups. Interestingly, the tags did not comment on the format itself—which is common among tagged photographs (Benoit, 2017).

Table 2 Most Frequently Used Tags per Group

Group A (Long Video)	**Group B (Short Videos)**
Christmas (14)	Cajun Christmas (19)
Papa Noel (13)	Louisiana (17)
Cajun (10)	Christmas (16)
Louisiana (9)	Papa Noel (16)
Cajun Night before Christmas (6)	Cajun (12)
Lafayette (6)	Bayou (11)
Natchitoches (6)	Bayou Parade (11)
Bayou (5)	Cajun Night before Christmas (10)
Cajun Christmas (5)	Food (9)

Additional analysis compared the generated tags with the video's existing metadata (which users did not see during the tagging process) to explore if tagging alone could replace item-level metadata. A compiled list of metadata from Table 1 was run through a stop list removal process. The resulting list of 89 metadata terms was compared with the unique generated tags from each group. Half of the metadata terms did not match the tags of either group while 39% match the overlapping tags created by both groups. Of the remaining matching terms, 9% of the metadata list matched tags created only by Group B and 2% match tags created only by Group A. The metadata terms that did not match included the date issued, duration, birth dates of subjects, and contributors (aside from Ms. Lucy).

Table 3 Tag Category Divisions per Group

Tag Category	Group A (Long Video)	Group B (Short Videos)
Description	52.2%	50.5%
Identification	42.1%	46.0%
Response	3.9%	2.8%
Other	1.7%	0.7%

Discussion

The statistically significant difference between the tagging rates of the two groups confirms the study's hypothesis that users will generate more tags per user after viewing short videos than viewing a single long video. Likewise, Group B (0.925) nearly doubled Group A's average number of tags per user per minute (0.537). Although the rates were different, both groups generated similar proportions of unique tags; indicating homogeny between the group participants—thereby further validating the study results.

Previous tagging studies often note the inclusion of so-called super-users or super-taggers (Benoit, 2017; Springer et al., 2008). While there is no clear delineation between a regular tagger and a super-tagger, the latter typically produce tags at least 150% of the average rate. As noted in Figures 1 and 2, the shorter videos slightly increased the likelihood for super-tagger occurrences with Group B including three compared to Group A's two. Similarly, the shorter videos had a significantly higher proportion of users exceeding 20 total tags than the longer videos. This result suggests users could not remember as many descriptive terms after watching for 30 minutes compared to 10 minutes. The study's platform, Qualtrics, did not allow for real-time tagging. If the study had users create tags in real time rather than after the video, there would likely be less difference between the groups.

While the study confirmed its hypothesis, the tagging rate decline between shorter videos for Group B was unanticipated (as shown in Figure 1). The displayed tagging fatigue suggests users' production follows a long tail style decline over time. A best practice approach would, therefore, increase the number of users creating tags while decreasing the number of short videos encountered in the tagging process. This would likely happen in a natural setting as most users would only engage with a low number of videos within a collection. If a repository utilized a gamification system, such as *Wasida?*, they should limit individual sessions to a small number of short videos (or video segments) to avoid tagging fatigue.

Another positive indication from the study was the lack of group difference regarding tag characteristics. Since the users were not divided based on domain expertise, the tags should be relatively similar in nature—as the data confirm. Previous studies recommended specific tag types such as cinematography, emotions, explanations, and facts in their instructions to users (Estrada et al., 2016). This study did not include recommendations, instead the instructions stated, "A tag, if you are unfamiliar with tagging, should provide some description of the video that would help yourself and/or others find it through search or browsing online." If a repository preferred specific types of tags, then more direct examples should be given to users.

Finally, the data suggest that tagging alone cannot replace item-level metadata for moving image materials since half of the metadata terms did not match generated tags. Over time, with additional users and tags, the long-tail principle suggests the proportion of metadata matching terms would likely increase slightly—but not significantly. Not surprisingly, the majority of matching tags relate to subject and title metadata fields. This replicates previous findings for photographic and textual documents, thereby indicating another consistent aspect of moving image tagging (Benoit, 2018).

Limitations

To focus on video length as a tagging variable, the study relied on a quasi-experimental design framework that requires limiting variables and uses a non-real-world interface (i.e., not an existing digital collection interface). Although this method produces concrete empirical data, its cannot explore every aspect of moving image social annotation within a single experiment. For example, the issue of tag quality, and the potential for misuse, remains a regular discussion avenue for social annotation projects (Matusiak, 2006; Benoit, 2017; Benoit, 2018). While this study found minimal issues, it did not specifically test for any inter-user quality assurance mechanisms like those found in gamification approaches (Estranda et al., 2015; Estranda, 2015).

The study used a professionally produced, holiday special from LPB for its sample video since it could be easily divided into three distinct segments of equal length. The video included voice-over narration, soundtrack music, and story-based editing. While these elements might influence the types (and number) of tags generated, the effects cannot be analyzed in this study. Likewise, the number of participants could be increased to verify the study's findings through replication in the future.

Conclusion and Future Directions

This article is the first in a series of moving image tagging studies exploring the unique aspects of moving image archival materials. The resulting empirical data will be used as the foundation for developing a guide to moving image tagging best practices. Focused on temporal effects, this study found that the average number of user-generated tags is influenced by the length of the video within moving image collections. Additionally, the findings suggest the following recommendations:

- When requesting comprehensive tagging (as opposed to time-coded), repositories should provide users with shorter videos than longer ones.
- If necessary, divide longer videos into shorter segments and aggregate the generated tags afterward.
- Using shorter videos within a tagging project will generate more super-taggers.
- To avoid tagging fatigue, increase the number of users tagging fewer videos rather than having users tag multiple videos in a single session.
- Do not rely on tagging alone instead of item-level metadata. Tags will most likely relate to subject and title metadata fields.
- If a repository is looking for specific types of tags (e.g., persons, emotions, etc.), they should include examples in their user instructions.

Future studies will continue exploring additional moving image tagging variables, including production type (professional vs. amateur videos); genre; participatory encouragement (gamification, rewards, recognition), and video length in time-based tagging.

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Tommy Sjöberg
Folkmusikens Hus
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Editor:

Bertram Lyons
Bertram Lyons, CA
AVP
634 W. Main St., Ste 201
Madison, Wisconsin 53703
USA
e-mail: editor@iasa-web.org

Webmanager:

Richard Ranft
Head of Sound & Vision
The British Library
96 Euston Road
London NW1 2DB
England
Phone: +44 (0)207 412 7424
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