EXPERIÈNCIES

MEEMOO - THE FLEMISH INSTITUTE FOR ARCHIVES. A CENTRALLY COORDINATED APPROACH TO AUDIOVISUAL DIGITISATION, SUSTAINABLE STORAGE AND ACCESS

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RESUM

Meemoo, l'Institut Flamenc d'Arxius, va ser fundat sota el nom de 'VIAA' a finals de 201 2 pel govern flamenc, com a resposta als reptes que planteja la degradació i l'obsolescència de la tecnologia audiovisual, la preservació digital i l'augment de la demanda d'accés al patrimoni audiovisual. A Flandes, com probablement a qualsevol altre país o regió, aquest patrimoni està gestionat per una diversitat d'institucions: emissores, arxius, museus i biblioteques, però també institucions governamentals, organitzacions d'arts escèniques, etc. Si cada organització hagués d'abordar aquest repte per separat, la les inversions públiques estarien enormement disperses. En coordinar la digitalització, l'emmagatzematge i l'accés de manera centralitzada i el desenvolupament d'una infraestructura central, es pot aconseguir un gran guany en eficiència i qualitat, sense tocar l'autonomia dels socis. Explicarem com es va originar Meemoo, com funciona i destacarem algunes xifres interessants i reptes en curs. També explicarem com Meemoo està ampliant actualment les seves activitats de digitalització en la direcció del patrimoni fotogràfic en la mateixa línia.

RESUMEN

Meemoo, el Instituto Flamenco de Archivos, fue fundado bajo el nombre de 'VIAA' a finales de 201 2 por el gobierno flamenco, como respuesta a los retos que plantea la degradación y la obsolescencia de la tecnología audiovisual, la preservación digital y el aumento de la demanda de acceso al patrimonio audiovisual. En Flandes, como probablemente en cualquier otro país o región, este patrimonio está gestionado por una diversidad de instituciones: emisoras, archivos, museos y bibliotecas, pero también instituciones gubernamentales, organizaciones de artes escénicas, etc. Si cada organización tuviera que abordar este reto por separado, las inversiones públicas estarían enormemente dispersas. Al coordinar la digitalización, el almacenamiento y el acceso de forma centralizada y el desarrollo de una infraestructura central, se puede conseguir una gran ganancia en eficiencia y calidad, sin tocar la autonomía de los socios. Explicaremos cómo se originó Meemoo, cómo funciona y destacaremos algunas cifras interesantes y retos en curso. También explicaremos cómo Meemoo está ampliando actualmente sus actividades de digitalización en la dirección del patrimonio fotográfico en la misma línea.

Introduction

For more than a decade, organisations managing important audiovisual heritage collections have been aware of the great challenge of audiovisual preservation, metaphorised magnificently by Indiana University's Mike Casey as a two-headed monster called 'Degralescence'[1]. With this portmanteau concept Casey pointed on the one hand to the inevitable physical decline of audiovisual carriers – such as magnetic tapes whose signal gradually becomes weaker – and on the other to the obsolescence of playback technologies, becoming concretely visible in the scarcity of functioning equipment and knowledge with specialised technicians and archivists.

Aware of this danger many of these organisations – at least in the wealthier parts of the globe – have set up digitisation plans large and small. Digitisation[2] is generally regarded as the only realistic strategy for preserving the content of these audiovisual heritage carriers and making them easily accessible on a large scale. However, setting up these digitisation projects comes with several major challenges. Firstly, they are often highly complex from a technical point of view. Specialised equipment and knowledge are required to make an inventory of the carriers, prepare them for digitisation by means of repairs or cleaning, carry out the actual digitisation and manage the resulting files. Wrong decisions can lead very quickly to the loss of scientifically, historically, legally, artistically, culturally, socially or religiously important information. This even applies to information stored via seemingly simple technologies such as the audio compact cassette[3].

Moreover, this digitisation is very expensive. In 2014 AVP, an American consultancy firm specialising in this domain, estimated the average price increase for the digitisation of audiovisual media across all types and formats at no less than 16% per year for the period 2013-2028[4]. Although this percentage is very difficult to verify – partly because projects can differ greatly from one another and there is little transparency regarding prices – it is clear that 'degralescence' already today results in rapid price increases.

It is logical that the first audiovisual carrier formats to fall prey to these price increases are those made with the oldest technologies. Moreover, the audiovisual heritage that will be the first victim is in the poorer parts of the world. The example of the 2 inch open reel quadruplex video tape, the oldest technology for magnetic recording of a video signal invented in 1956, illustrates this. The Ampex VR-2000, a widely used machine to record and play these tapes, was launched in 1964. Due to the emergence of new technologies, these machines were written off *en masse* in the 1980s. The remaining machines are so large and technically complex that they can hardly be repaired. The last technicians to have real-life experience with these machines are well past their age of retirement.

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

2 - For the sake of clarity, the term digitisation is used in this article referring to the conversion of an analog signal into a digital signal. Nevertheless, the threat to the carriers, the playback technology and the knowledge about it apply as well to audiovisual information carriers with a signal that is already digital (such as the Digital Audio Tape or the Digital Betacam) or even file-based (such as the DVD). Sometimes the term 'digital transfer' is used to describe the transfer of information on these last types of carriers to an infrastructure for digital mass storage. The word 'migration' is then used as an umbrella concept for all types of carriers together. On the differences between both concepts: DECLERCQ, B. (2022, 5 April) Tech blog: digitisation versus digital migration. Retrieved on 21 July 2022 at https://meemoo.be/en/publications/digitisation-versus-digital-migration.

3 - DECLERCQ, B. (2021, 30 augustus) De audiocassette: uitdagingen bij conservering en digitalisering. Retrieved on 21 July 2022 at https://www.avanet.nl/de-audiocassette-uitdagingen-bij-conservering-en-digitalisering/.

4 - LACINAK, C. (2014, 23 October) The Cost of Inaction Calculator. Retrieved on 21 July 2022 at https://www.youtube.com/watch?v=OnMF8PssTPA.

Spare parts are ever harder to be found. In 2016, examining the period 2006-2015 in the United States, Chandler[5] found digitisation prices that fluctuated between USD 206 and USD 292 per reel. But four years after Chandler's article, Rodríguez Reséndiz and Manfredi[6] pointed out that there are still tens of thousands of 2 inch open reel quadruplex videotape left to be digitised in Latin America. Saving this heritage – which actually stems from a historically particularly turbulent Cold War period for many Latin American countries – therefore becomes *de facto* unaffordable for many audiovisual archives in the region.

The third challenge in the digitisation of audiovisual heritage is that it is preserved in a very dispersed way. Already in the first version of his later expanded standard work on the philosophy of audiovisual archiving, Ray Edmondson[7] pointed out that the audiovisual heritage is preserved by a great diversity of actors. The largest audiovisual archives are managed by institutions for whom these archives are certainly very valuable, but not in their core business: public and commercial radio and television broadcasters. Compared to these broadcasters, the traditional heritage management institutions (galleries, archives, libraries, museums) often manage smaller, but also important audiovisual collections. In addition, audiovisual heritage can also be found at government institutions, arts organisations, schools and universities, churches, research centres, privately held companies, with individuals and so on.

The combination of these three challenges in the digitisation of audiovisual heritage, the technical complexity, the high cost and the wide dispersal, means that solutions are not obvious. The world's best known large-scale audiovisual digitisation projects, such as the Plan de Sauvegarde et de Numérisation (PSN) at the Institut National de l'Audiovisuel (INA) in France, the Images for the Future project in the Netherlands and the Media Digitisation and Preservation Initiative (MDPI) at Indiana University in the United States, focused on the collections of only one or two major institutions. Other projects, such as the Unlocking our Sound Heritage project under the lead of the British Library had a national objective but had to invest heavily in training programs to make a large number of staff from heritage institutions great and small acquainted with the theory and practice of audiovisual digitisation, as that was carried out in many different places.

In this article we present the solution as it has been implemented in Flanders since 2013 by VIAA –since February 2020 known as meemoo. It is a major and long-term effort, widely rolled out but centrally coordinated, focusing on quality, carried out under the guidance of experts and working in a very cost-efficient manner. In addition, the Flemish solution also makes it possible to meet a fourth and yet unmentioned challenge, namely that of the ever-increasing demand for access to the content stored on the digitised media. Finally, this article will also point out how this approach fruitful for audio, video and film collections is currently being expanded towards the Flemish photographic heritage.

The genesis of a new institution

It is important to underline that the founding of meemoo, then still under the name of VIAA, was preceded by a long process of discussions, doubts and issues considered fundamental and hardly resolvable. That is why the overview of the evolution of meemoo starts even before the actual creation of the institution.

As early as 2006 the then still rather theoretical and far-away risks of the degradation of audiovisual media and the obsolescence of playback technologies made their way to the political agenda in Flanders. Difficult access to the contents of the media was regarded

5 - CHANDLER, R. IASA Research Grant Report: A Study on the Changing Prices of Audiovisual Digitization 2006-2015. In: IASA Journal, 46 (1, 2016).

6 - RODRIGUES RESENDIZ, P. and MANFREDI, M. Preservación digital en los archivos sonoros y audiovisuales de Iberoamérica: retos y alternativas para el siglo XXI. Quito, Universidad Andina Simón Bolívar, 2020.

7 - EDMONDSON, R. A Philosophy of Audiovisual Archiving. Paris, UNESCO, 1998.

as an equally important problem. During several research projects between 2008 and 2010[8], Flemish media and 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.

In this period, the main discussions were about technical differences between the cultural heritage institutions and the broadcasters and about the question whether this institution should be conceived more from a centralising or a distributed functioning. But once these issues were overcome and a political will to put the results of the research into practice had grown, the economic crisis of 2008-2011 caused a major delay in the implementation of the plans. On 21 December 2012 however, the task of founding a 'Flemish Institute for Archiving', abbreviated as VIAA, fostering it and raising it to become an independent organisation within two years, was given to iMinds, a Flemish government institution offering incubation facilities to start-ups in the field of ICT and broadband technology based in Ghent.

VIAA's first two years were still very much characterised by uncertainty and inconsistency of political support for this new organisation. 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 first major digitisation project for audiovisual media, the largest up until then in Flanders, involving no less than audiovisual 170.000 carriers from 40 organisations; a sustainable digital storage infrastructure of 2 x 300TB disk space and 2 x 17 PB on LTO, ruled by a state-of-the-art hierarchical storage management (HSM) and a multi-tenant media asset management (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 accomplishments were followed by a prolongation of VIAA's mission by the Flemish government. From 2016 VIAA would have a yearly subsidy of around 4.4 million euros, expand its activities and become an independent institution, leaving behind the safe haven of iMinds.

In the period 2016-2019, VIAA grew steadily. Digitisation projects were set up for dozens of media formats, the digital archive became more and more filled, including a copy of the archive of the public broadcaster VRT and digital interaction platforms were further expanded. In 2019, the Flemish Government asked VIAA to merge with two other important players in the Flemish digital heritage domain: PACKED, the Flemish expertise centre for digital heritage, and Lukasweb, the brokerage platform for high-quality photos of Flemish works of art and heritage objects. This merger, which resulted in the name change to 'meemoo – Flemish Institute for the Archives' in February 2020 – marked a clear broadening of scope for VIAA. Not only is the focus no longer exclusively on audiovisual content, the portfolio of services for which meemoo can be called upon has also been expanded. Meemoo is now no longer just the institution in Flanders that coordinates major digitisation projects, digital storage and access for audiovisual heritage. *De facto* it has also become the point of contact for advice, research and development of everything related to digital archive processes.

With regard to the digitisation of the Flemish audiovisual heritage, meemoo has today transferred the content of more than 540.000 carriers to its infrastructure for sustainable digital mass storage, calling upon the services of twelve digitisation companies in five countries. The collections remaining to be digitised consider several tens of thousands of films in good state and the vinyl collections. It is no coincidence that these are relatively stable media formats, whose playback equipment is not acutely threatened, which undoubtedly makes digitisation less urgent.

8 - To be mentioned in this context are BOM-VL (Preservation and Disclosure of Multimedia Data in Flanders, focusing on both cultural heritage collections and broadcast archives, 2008-2009), Vlaanderen in Beeld (Flanders in Pictures, focusing on broadcast archives only, 2009-2010) and Archipel (focusing on cultural heritage collections, 2009-2010).

The capacity of meemoo's digital archive infrastructure is currently being expanded from 2 x 17 PB to more than 70 PB, not by expanding the LTO library itself, but by migrating from LTO 6 to LTO 8[9]. Another notable evolution is the switch from MXF/JPEG2000 to MKV/FFV1 as the master format for digitised video files from non-broadcaster content partners. With this choice, meemoo saves storage space and follows an international move towards even more sustainable video file formats, which prominent audiovisual archives such as Indiana University's, the New York Public Library and the British Film Institute have also followed. This migration to a new generation of LTO tapes and the conversion of the video files into a new master format takes more than two years due to the size of the archive.

As far as access to the collections is concerned, meemoo has developed a whole portfolio of platforms today. The Archives for Education mentioned earlier has acquired a particularly strong position in the education sector, as the platform par excellence where Flemish teachers from primary and secondary education find audio and video content. Fed by an editorial team consisting of own meemoo staff and teachers on secondment at meemoo, 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. Moreover, since 2020, also pupils have access to this platform, where they can do research and carry out assignments prepared by their teachers.

In addition, from 2017 VIAA developed CatalogusPro, a platform on which the content partners of meemoo can consult each other's audiovisual collections, in order to encourage and facilitate professional content exchange and reuse. Hetarchief.be (The Archives) was also opened in 2019, as a platform where the general public can search the descriptive metadata of the audiovisual collections of the content partners of meemoo and, if desired, contact the relevant partner to ask to have the actual image or sound material made available. A major realignment of this range of supply platforms is currently underway. The intention is to offer all content that meemoo manages on its storage infrastructure through one central platform, where the search results will be different, depending on the work context of the user (education, research, general public) and the access conditions that the content partner has determined for its content. In this way, both the wishes of the content partners and the copyright provisions are respected.

How meemoo works

Today meemoo has a staff of about 40 full time equivalents supplemented with a varying number of interns and teachers working on secondment. No less than 165 public, commercial and regional broadcasters, cultural heritage institutions, city archives, government bodies and performing arts organisations together called 'content partners' participate in meemoo's digitisation, archiving and access activities[10]. Although similar collaborations have been developed in India[11] (National Cultural Audiovisual Archives, NCAA) and in New Zealand[12] in recent years, there is no other known example of such a broad network worldwide that focuses specifically on this type of collaboration.

The principles of collaboration

Before the founding of VIAA in 2012 the broadcasters and cultural heritage institutions involved had very different missions and these were naturally reflected in their approaches to digitisation, archiving and access to their collections. However, from the end of

9 - PRIEM, M. (2020, 18 June) Migration and capacity expansion in the meemoo archive system. Retrieved on 21 July 2022 at https://meemoo.be/en/news/migration-and-capacity-expansion-in-the-meemoo-archive-system.

10 - A full overview of meemoo's content partners can be found at https://meemoo.be/en/content-partners.

11 - The National Cultural Audiovisual Archives of India coordinates the digitisation of several hundreds of thousands of audiovisual media of more than 30 content partners. Cfr. DECLERCQ, B. and ZUBERI, I. Joining Forces in Audiovisual Digitisation, Digital Preservation and Access. In: IASA Journal, 49 (2, 2018).

12 - In the 'Utaina' project the Te Puna Mātauranga o Aotearoa (National Library of New Zealand) collaborates with Ngā Taonga (the national audiovisual archive of New Zealand) and the Te Rua Mahara o te Kāwanatanga (National Archives of New Zealand) to digitise around 400.000 magnetic audiovisual carriers. Cfr. S.N. (s.d.) Utaina. Retrieved on 21 July 2022 at https://www.archives.govt.nz/about-us/our-work/utaina.

the 2000s onwards, the Flemish government made it clear that spreading the investment in these domains over the full range of institutions managing audiovisual heritage collections was not an option. In other words, collaboration was the only realistic model, even beyond the traditional sectoral boundaries.

It was clear from the beginning that VIAA had no plans whatsoever to replace the content partners in any of their activities. On the contrary, the intent was and still is to be complementary: where the content partners often lack the knowledge and resources – particularly in the audiovisual domain - to set up processes around large scale digitisation, archiving and access, meemoo offers services on a technical rather than on a content level.

Collaboration with VIAA happens on a voluntary basis. In principle, all the services provided by meemoo are at no cost for the content partners, except for an annual contribution of 15% in the digital storage costs. In exchange, the content partners allow meemoo a non-exclusive right to publish the content on its platforms, while always respecting the applicable copyrights. This proposal was initially sent out to all Flemish broadcasters (public, commercial, regional), all quality-labeled heritage institutions (heritage libraries, archives, museums) and the main city archives. From the moment the available resources allowed it, the Flemish regional government organisations (e.g. the Department of Public Works), the recognised performing arts organisations and the so-called heritage cells (inter-municipal partnerships in heritage management) were offered partnership as well. In practice meemoo's proposal proved to be attractive enough for nearly all organisations that were eligible and that were managing an audiovisual collection. Although this has never happened, the content partners can also cancel their cooperation with meemoo at any time. All their data is then transferred again and removed from meemoo's systems.

A diversity of partners

Although these organisations are evidently very different, a few sectoral similarities can clearly be recognised. 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 preservation 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 quite different in the media sector. While the size of a regional broadcaster's archive – which started in Flanders only in the mid-nineties – 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 number of Betacam cassettes that the Flemish commercial broadcaster VTM submitted to meemoo for digitisation is about 65.000. That's two times as much as the largest audiovisual collection all formats together in the Flemish cultural heritage sector, preserved at KADOC, the Leuven based documentation and research centre on religion, culture and society. The Flemish broadcasting collections are not only larger, but also technically more homogeneous. Given the available technical expertise and the fact that the institution that 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 several parallels with those of the cultural heritage sector, but what they have in common with broadcasters, 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 amateur and semiprofessional video formats (VHS, DV cassettes, DVD) do stand out when it comes to quantity. As with the broadcasters, in the performing arts institutions the archives managers work for the same organisation as the one that 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 the carriers' content. Although the

storage conditions in this sector are often 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.

The course of a digitisation project

Meemoo's digitisation projects work more or less like a joint purchase under a central coordination, with an external digitisation service provider[13]. The projects don't focus on the collections of one content partner, but on one or several, similar media formats[14]. It's precisely by bundling all these carriers that significant economies of scale can be achieved and the prices offered are significantly reduced. The number of content partners involved per project varies widely. For rare media formats usually only a few partners take part, but for the most widely distributed ones, the number of partners can reach as many as one hundred. The different project phases for a typical digitisation project are described below.

During the first phase, the project preparation phase, the digitisation market is explored if necessary. Potential candidates to carry out the digitisation are contacted and asked about their interest. In addition, the figures resulting from earlier inventory exercises are checked and updated if necessary. Given the labour-intensity of this updating process, meemoo has been developing a special software tool for this in 2020, which allows content partners to keep their numbers of media per format up-to-date without the intervention of meemoo employees. Once these figures have been collected and verified, the scope, timing and project budget can be determined more precisely. The project lead decides which metadata must be collected during registration (cfr. the next project phase) to ensure that the logistics and digitisation processes run smoothly. If necessary, the registration software in which each content partner registers the carriers individually is adapted for this purpose. Finally, meemoo's logistics staff purchases registration and packaging materials and takes care of the shipment to the content partners involved. The entire project preparation phase can easily take several months.

Shortly after the market survey has been completed, the tendering phase starts. Based on the project's scope, timing and budget, an appropriate tender procedure is selected in accordance with applicable legislation. Although meemoo has gained a lot of experience in preparing tender dossiers and many elements can be copied from one project to another, experience also shows that every project is different and sometimes quite important adjustments are needed. In principle, the tender file consists of three main documents: an overview document (with all administrative provisions and the procedure), a background document (with a description of the media to be digitised and the technical requirements for the implementation and the projected project timing), and a price matrix in which the candidates have to fill in their price proposal. Usually these main documents are accompanied by a whole series of technical appendices, such as the specifications of the output and reporting files in XML. Before the tender dossier is published, the content partners are also given the opportunity to formulate their comments or even request adjustments. Because meemoo's way of working is now well known and has gained trust amongst content partners, important comments are rarely formulated. Once the offers of the candidates have arrived, they are evaluated by an assessment committee in which the content partners themselves are also represented. Considering the estimated value of the contract and the internal delegation arrangement within meemoo, the approval of meemoo's Executive Board is required for most digitisation tenders. Depending on

13 - Exceptionally a different approach occurs, for example for the 'Wave 5' digitisation project, for lacquer and shellac disks. Since more than 90% of the carriers to be digitised came from the Flemish public broadcaster VRT, since they still held qualified personnel and devices and since the transport of these carriers entailed risks of damage, it was decided to digitise all carriers at VRT's studios, also those of other content partners. However, as the available digitisation capacity was insufficient to complete the project within the set time limits, an external digitisation service provider was also hired, who took care of the digitisation of shellac plates in particular, on premise at the VRT.

14 - We refer for example to the 'Wave 9' digitisation project, in which the contents of several types and formattings of optical disks were transferred.

the complexity of the file, the tender phase from the first drafts until the awarding of the contract can easily take six months[15].

In a typical digitisation project meemoo does not do everything by itself though. An effort is also expected from the content partners' side, particularly during the registration phase. In preparation for the digitisation, they have to label, package and register a number of technical characteristics of each individual carrier in an online database set up by meemoo. For example: for the registration of some 100,000 ¼" audio tapes alone, the public broadcaster VRT had employed two full-time employees for almost five years. Wrapped in XML files this data is used for the planning, identification and tracking of the carriers throughout the process, but they also provide the digitisation service provider with interesting information for their planning and the tuning of their equipment. During the transfer process itself, this registration metadata is supplemented by the digitisation service provider with extensive documentation of the process. The supplemented XMLs are stored together with the essence files on the digital archive system of meemoo and in the registration database. This allows content partners to check in all transparency how the digitisation of their carriers has progressed. In principle, the registration starts while the tender is still in progress. In this way, a sufficiently large number of registered carriers is available for the digitisation service provider at any moment. Usually, the last carrier has not yet been registered when the first one is digitised. The length of the registration phase is highly dependent on the number of carriers to be digitised: for small quantities it doesn't take more than a few months, while for the largest projects this phase lasted several years.

The next phase is the test and pilot phase. This phase starts with a kick-off meeting, in which the project leads of meemoo and the digitisation service provider go through all the details of the project in detail and record them in a so-called Project Agreements Document (PAD). Meemoo's project lead selects a limited number of carriers representative of the diversity of carriers in the project. These carriers go through every process step provided. In principle, the same instruments are used, the same workflows followed and the same employees deployed as during the production phase. Each process step is carefully tested until it runs smoothly and none of the parties involved have any questions left. For example exception scenarios are documented in the PAD. A pilot then takes place in which a small amount of carriers go through all the process steps one after the other. One could metaphorise this as a dress rehearsal, in which, in principle, no more surprises should arise. The test and pilot phase can easily take several months, depending of the technical complexity of the project and unforeseen issues.

If the pilot is successfully executed, the PAD is signed and the production phase can start. The total amount of carriers to be digitised is subdivided into batches, usually equal to the estimated volume of carriers that can be digitised on average per month16. From a logistical point of view, three stages are usually used: the carriers of a certain batch are first located with one or more content partners. The batch is then transported to the digitisation service provider, where it is put on hold. Finally, the carriers of the batch are digitised. In this way, the risk on interruptions because of a lack of carriers is reduced significantly. When all carriers have been digitised, the carriers from this batch return to the content partner(s) involved[17]. During dig-

15 - True to its principles of transparency and openness, meemoo publishes every digitisation tender on its website, so that interested colleagues can read it for their inspiration. These tenders are available via https://meemoo.be/en/publications/Filter/type:tender/count:15.

16 - Meemoo is generally flexible in determining the size of the batches and the transport calendar. The main constraints in this regard are imposed by the registration capacity of the content partners and meemoo's available annual budgets.

17 - This approach is clearly inspired by the 'Preservation Factory' principles, as developed during the EU funded PrestoSpace project. Cfr. WRIGHT, R. (8 March 2013) The Preservation Factory Approach. Retrieved on 21 July 2022 at https://kennisbank.avanet.nl/preservation-guide-the-preservation-factory-approach/.

itisation, the service provider documents its actions in one XML per carrier. The file package delivered[18] usually consists of one or more essence files (image and/or sound), the XML with the metadata resulting from the registration and digitisation and an XML with technical file characteristics, generated with open source tools such as MediaInfo or MediaConch. In principle one file package is written on an LTO tape for each carrier. All LTO tapes are then delivered together per batch to meemoo's data centre. The tapes are ingested there following a fixed procedure: the file packages are automatically checked, for example on completeness, formation and viruses. Browse copies are made and the files are written to an LTO tape that remains in the library. Two further copies are made: one for a second, mirrored tape library at a sufficiently remote location, the third one for off shelf storage in a secured bunker abroad. The consultation copies are then available in the tenant of the content partner involved, on the MAM system of meemoo. The content partners are supposed to check the quality and add descriptive metadata, but they can also take further file management actions, including viewing or listening, downloading or even discarding their files and adjusting reuse rights.

After the last carriers have been digitised and the resulting files have been delivered, during the evaluation phase meemoo performs end-to-end checks to check completeness of the files and the documentation of the process for each and every carrier. The project lead also drafts a final report including a statistical analysis of the project results. Like the tender files, these results are also shared on meemoo's website.

After the digitisation

After the digitisation the files are primarily made available to the content partners via meemoo's MAM system, through which they can manage their collections. It is important to underline that meemoo's digital storage infrastructure is now being used for more than just the files from meemoo's own digitisation projects. Digital born files or files resulting from digitisation projects set up by the content partners themselves can also be ingested. In this way, there are now also digitised newspaper collections or even herbaria stored on this infrastructure. 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, several other MAM services 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.

Meemoo's digital archive infrastructure is connected to a number of own outlets, such as the ones mentioned earlier. The content is published in a manually curated (e.g. on the Archives for Education platform) or automatic (hetarchief.be, CatalogusPro) manner. The content partners have the right at all times to prevent the publication of certain content or even metadata on an item per item basis. However, the main reason why much content cannot be made accessible to the general public online remains copyright. In this respect meemoo has tried to explore the possibilities offered by legislation from its inception, for example by authenticating certain user groups or limiting the context in which viewing and listening is allowed.

The expansion of meemoo's activities towards photographic heritage

With the approval of the Flemish Minister of Culture meemoo in 2019 started to investigate whether the existing approach for the digitisation of audiovisual heritage could also be applied to photographic heritage. In particular, it was necessary to examine how the size and dispersal of the collections, their nature, their technical characteristics and their physical condition would influence the design of new digitisation projects. Various research actions were taken for this purpose from 2019 to 2021. First of all existing specialist networks were explored, both nationally and internationally, to gain a good understanding of the state of affairs in this domain. In addition, photographic heritage materials and techniques were identified and defined.

18 - According to the jargon of the Open Archival Information System (OAIS) this is the Submission Information Package (SIP) as it is delivered to the archive.

Finally, an inventory was made of the collection sizes, their condition and current and past activities in the cultural, media and government domains. In 2019-2020 no less than 295 organisations were surveyed to gain a better understanding of the collections, practices, challenges, needs and wishes with regard to the digitisation of their photographic materials. The answers were collected and analysed in a detailed report available on the meemoo website[19].

Following this initial field study meemoo took a second step, researching the prerequisites and the feasibility of large scale photo digitisation and archiving. This second phase resulted in another thorough report proposing ten specific projects. Five proposals focused on the digitisation of different types of around 8.5 million photos in total. The other five proposals aimed at providing various kinds of support, including for identification, selection, quality control, metadata enrichment and rights documentation[20].

In February 2021, just after the publication of the second research report mentioned above, funds were released by the European Regional Development Fund (ERDF) for the relaunch of the European economy after the covid19 epidemic. Through the economic recovery plan of the Flemish government, meemoo was able to call on these resources to implement one of the ten proposals unexpectedly quickly. Since the funds were allocated only once, a one-off project feasible in the short term had to be set up.

In May 2021, the necessary budget to set up a digitisation project of circa 170.000 photos on glass plates (used in this context as an umbrella term for glass negatives, positives, stereo negatives and positives and lantern slides) was confirmed, spread over 31 content partners. These figures make it probably one of the biggest glass plate digitisation projects ever in Europe. Meemoo plays its traditional coordinating role in this project, although specific expertise was hired to learn about the technical characteristics of the materials involved and the specific technical requirements of glass plate digitisation. The registration and packaging of the glass plates started at the beginning of 2022. The digitisation itself is estimated to run until October 2023. In the summer of 2022, the milestone of 85.000 registered and packaged glass plates was achieved. In order to optimise the accessibility of the glass plates and to encourage reuse, meemoo also wants to make this photo material widely available from the autumn of 2023. The digitised glass plates will be made available on the meemoo platforms and, if they wish, on the platforms of the participating content partners. The project should be completed by the end of 2023.

The glass plates project not only safeguards an important and endangered part of the Flemish photographic heritage. It also offers meemoo the opportunity to gain experience with this carrier and to demonstrate that the approach for the digitisation of audiovisual heritage can be extended to photographic heritage. In addition to this digitisation project, meemoo is also taking another initiative. The online tool Knowyourcarrier.com, with which different types of audiovisual heritage carriers can be identified and their heritage value and digitisation requirements can be determined, will be expanded with a section on photographic archive materials. Even though it isn't certain that meemoo's scope will be structurally expanded to include photographic heritage, still these projects already lay a solid foundation for that possible future task.

Conclusion

In this article we have presented the Flemish answer to the challenges posed by degradation and technology obsolescence, digital preservation and increasing demand for access to the audiovisual heritage. We have explained where the need for an organisation such as meemoo originated from, how the organisation has grown and how it exactly works, with particular attention for the collaborative model, the different types of partners and the course of a typical digitisation project.

19 - NIJSMANS, L. (1 June 2020) Phase 1 of our photographic research: the summary report. Retrieved on 21 July 2022 at https://meemoo.be/en/publications/phase-1-of-our-photographic-research-the-summary-report.

20 - NIJSMANS, L. (14 February 2021) Report: phase 2 of our photo research. Retrieved on 21 July 2022 at https://meemoo.be/en/publications/report-phase-2-of-our-photo-research

This overview shows that the way in which meemoo is conceived and how its processes are set up, offers several advantages. Firstly, the setup of its digitisation projects offers a cost-efficient, effective and qualitative solution to the challenge of the degradation of audiovisual archive media and the obsolescence of the playback technology. Secondly, this solution provides an answer to the particular challenge of the wide dispersal of audiovisual heritage, while respecting the autonomy of each institution managing an audiovisual archive collection. Finally, building on the central coordination of digitisation and the centralised, sustainable digital storage, successful access platforms can be built and tailored to the needs of very diverse target groups.

It is important to underline that a central, coordinating role such as it is assumed by meemoo does not necessarily have to be taken up by a newly established institution. An existing institution that receives a coordinating mandate from the participating partners - and possibly the government - can also fulfill this role. Nor is it necessary to collaborate in all the traditional archival working domains. Collaboration in one or more areas can already yield large economies of scale, although this collaboration is certainly recommended in the fields of digitisation and setting up a sustainable digital storage infrastructure. As long as the responsibilities and commitments are well-defined, a consortium of peers might reach the same goal.

With its recently established project for the digitisation of Flemish photographic glass plates collections, financed with European economic recovery funds, meemoo is currently taking the first steps towards a possible extension of its mission to photographic heritage. This project can be seen as confirmation of the trust that meemoo has built up not only with the content partners, but also with the Flemish Government. Hopefully it can also be a source of inspiration in other countries. After all the challenges posed by digitisation, archiving and access to audiovisual and photographic heritage today are a pressing phenomenon globally.