

## **Broadcast Professionals User Studies**

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In this deliverable we present a first overview of findings about the characteristics and preferences of professional users of multimedia services in the Netherlands. The goal is to give an overview of the user studies that have been held at Sound and Vision during previous research projects and in the user studies that have been held during Q4 of 2011 at Sound and Vision.

The results of these investigations led to a snapshot of the search requirements of media professionals in the audiovisual domain and a provisional summary of the wishes and needs in relation with a professional search system. Further investigations of their search behaviour and the knowledge are necessary in order to optimise the tools they work with and is to be done in the remains of the project.

## **1. Introduction: User description**

### **1.1 Description of the user group**

Although the term 'media' or 'broadcast' professional is a broad term that can be used for a variety of people who work in the field of audiovisual content provision, here we limit the scope to those who use audiovisual search engines in a professional capacity, with the aim to find audio-visual content in archives for reuse. The term comprises a large variety of users that search for audio-visual content materials: Documentary film makers, journalists and news editors working at broadcast companies, freelance image researchers and research employees at archives. What they all have in common is that they locate audio-visual materials to be reused in new productions or broadcasts.

Audiovisual archives employ a number of these professionals:

1. Image researchers provide services to production companies and enterprises (business research). They process requests for specific footage and/or licenses from

external broadcasters, freelance image researchers, programme makers and research agencies.

2. A second group processes requests coming from NGOs, students and academic institutions and the not-for-profit sector (educational research).
3. Queries from home users (consumer research) - a service that for instance BBC does not provide but Sound and Vision does - is a third, albeit small, category.
4. A fourth group rummages the catalogue in search of materials that the archive can put to use itself (internal research): For publishing clips on public access platforms, for the in-house museum exhibitions, the institution's websites, for the creation of in-house productions or for use as data sets for international research projects, such as TRECVID.

Broadcast professionals foreign to the archives either work on a freelance basis or are contractually bound to broadcasters/production houses. Media professionals who search and retrieve content work with the archive's content storage database and include a varied group of video editors, web masters, social network administrators and mediators. Journalists and editors search and retrieve previously produced content for reuse, inclusion or adaptation in future productions. In the domain, the image research tasks seem to be divided over a small group of experienced, professional users who spend a large part of their (free-lance or contractual) work on search requests. Next to this core group, most editors for productions spend some time on low-level search. Often this task is given to junior editors or interns. Senior or freelance researchers are then relied upon for the more challenging tasks or systems.

## 1.2 Study approach

There are several ways to look at and approach the professional external to the archive. Many have close personal contacts with the service personnel or the professional image researchers who work in the archives. After all they constitute the primordial user base of the archive's systems. Secondly, a few specialised channels and organisations exist through which knowledge is shared and training is made available, such as the AMIA list (North-America) or FOCAL International. The user studies described in this document focus primarily on the systems provided by Sound and Vision and their user-base.

Studies that have been performed in related projects – such as MuNCH, the in-house user studies centered around the iMMix catalogue and AXES - specifically focused on functional requirements and used the following strategies:

1. **Observations:** Users are observed while they perform audio-visual searches and explain how they work. Acknowledging that requirements may change as users' understanding of the possibilities of modern access technology grows, a selected group of users can be consulted repeatedly in follow-up interviews.
2. **Participation:** Invited users take part in global benchmarking activity TRECVID interactive Known-Item Task or in a workshop setting (e.g., at conferences where users can be expected) where they can be contacted to exchange information about research methods.
3. **Group elicitation** exploits the team dynamics to elicit a richer understanding of needs. Bringing a panel of professional researchers together and discuss results of an on-going study may be an opportunity to do this. Another way of presenting and discussing development progress, is showing mock-ups of the system to learn about various ways of interacting with the information that can be provided by deploying new search technologies. Showing prototype systems in different stages of development can enhance and/or validate requirements.

Since interviews and group elicitations are labour intensive, time consuming and limited both in the amount of participants and in geographic location, automated research methods and broad surveys are also set up.

1. **Query log analysis** provides a method to investigate a large number of search queries without interrupting the search process.
2. Transaction log analysis is a tool to follow up on the different steps that constitute the professional's activity – all the way up to the point of ordering audio-visual materials
3. **Online surveys** by means of online tools provide a way to query personal opinions on a large scale in an international context.

These various research methods into the aims and methods of the professional broadcast researcher have been used over the past few years to grant Sound and Vision a profound understanding of its user base's needs and to aid development of search tools in various projects, the results of which have been summed up in this document.

## 1.2 Persona

The term 'Persona' was first coined by Alan Cooper, defining it as a 'fictitious, specific and concrete representation of target user'.<sup>1</sup> Xin Wang states a persona is composed of 'refined information from real life or the imagination. It is a virtual person who has a human face, a job title, an educational background, and some characteristics of real human beings.'<sup>2</sup>

Personas are not actual people but rather descriptions of the archetypical user that will help at least to a) understand the user; b) classify assumptions and c) explore the design.<sup>3</sup> Nowadays, personas are used for all sorts of projects, ranging from magazines and newspapers to digital cultural heritage resources like Europeana<sup>4</sup> but also user interface design.<sup>5</sup>



Based on the contacts we had with image researchers, the knowledge of our internal research team and information coming out of job descriptions and professional LinkedIn profiles, we created the following persona to start with as a basis for this user group:

*Tamara, 37, Image researcher, Amsterdam*

Tamara works as a freelance image researcher. She's held a number of different positions as a producer and editor of television programmes, through which she built up a closely knitted group of contacts she regularly cooperates with. She often works repeatedly for a selected number of programmes and free-lances on smaller productions on the side. She knows how a television organisation works and what the demands are from her different employers, some of which she's been working for for several years and has a close personal relationship with.

She often works within the speed of a production environment, but prefers to work on longer projects, where she can rely on the depth of her network to unearth the never-before seen materials. As she has a hard time finding materials that haven't been seen repeatedly, she'll try to match the mood of a programme as well as possible in the shortest amount of time necessary.

<sup>1</sup> Cooper, Alan. (1999). *The Inmates are running the Asylum*, Macmillan, quoted in Xin Wang, *Personas in User Interface Design* <http://pages.cpsc.ucalgary.ca/~saul/wiki/uploads/CPSC681/topic-wan-personas.pdf>

<sup>2</sup> Xin Wang, *Personas in User Interface Design*, page 2 <http://pages.cpsc.ucalgary.ca/~saul/wiki/uploads/CPSC681/topic-wan-personas.pdf>

<sup>3</sup> <http://www.user.com/personas.htm>

<sup>4</sup> Katja Guldbaek Rasmussen, Rie Iversen, Gitte Petersen, *M3.2.3 Personas Catalogue Europeana* [http://www.europeanaconnect.eu/documents/M3.2.3\\_eConnect\\_PersonasCatalogue\\_v1.0\\_20091228.pdf](http://www.europeanaconnect.eu/documents/M3.2.3_eConnect_PersonasCatalogue_v1.0_20091228.pdf)

<sup>5</sup> Jonathan Grudin & John Pruitt, *Personas, Participatory Design and Product Development: An Infrastructure for Engagement* <http://research.microsoft.com/en-us/um/redmond/groups/coet/Grudin/Personas/Grudin-Pruitt.pdf>; John Pruitt & Jonathan Grudin (2003) *Personas: Practice and Theory* <http://research.microsoft.com/en-us/um/people/jgrudin/publications/personas/dux2003.pdf>

Tamara took a higher education in film & television sciences, followed a number of specialisation courses throughout her career and has a great love for the medium. Her knowledge about physical carriers is basic: She is old enough to have worked with a demanding archival process in which she had to wait for video renderings of the materials, but has enough experience within the television environment to have grown along with its demands for versatility and turnaround speed. She follows with great attention the development of national and local digitisation projects but is ambivalent about the opening up of archival materials through YouTube and other online platforms. She knows the limits of copyright but is sometimes urged by her employers to override them and will from time to time use clips from unofficial, online sources.

With pressing deadlines, she feels comfortable to use systems she knows her way around in and knows she can rely on. The same goes for the people she collaborates with. She is used to working on different desktop PC setups, and knows her way around a Mac as well. She often relies on a limited amount of resources for the pressing tasks at hand. She is media savvy however, and built a Wordpress site to advertise her one-person company, with the help of a media professional. She's quick to learn new tools and interested in possibilities, but needs to see it function within her own workflow, rhythm and demands.

She regularly works with the back catalogue of Sound and Vision and knows very well how to find her way around the system. She also uses the in-house systems that are present at the various broadcasters, and international broadcast sources. She works with various online media but is first and foremost focused on the sources she already knows are trustworthy. She is focused on a number of specific, historical topics, but will work on any subject when the need is there.

## 2. Related work

The cataloguing system at Sound and Vision, iMMix, is used on a daily basis by a large number of professionals. In cooperation with both the University of Amsterdam and the Free University of Amsterdam, the access, use and performativity of this system is closely monitored in order to improve the accessibility of the collections. Over the past few years, Sound and Vision has – in the context of various research projects and trajectories – made use of query log analysis<sup>6</sup>, transaction log analysis and a case study to collect information on the search behaviour of broadcast professionals.

### 2.1 Query log analysis

The first query log analysis on iMMix was performed in December 2008 and January 2009. Analysis took place within the framework of the VIDI-Video<sup>7</sup> and MuNCH<sup>8</sup> projects. Based on the query logs, user-centred observations, relevant literature and an online questionnaire in 2008, the VIDI-Video project voiced ten requirements for its design approach of a professional video search system:

1. Broadcast professionals have a need to see and access items in their broader context as well as a strong orientation towards entities, themes and events.
2. Visual search engines should provide the possibility to browse for sections that are relevant to their information needs within a given video.
3. Different information channels should be combined: metadata, subtitles, ASR, sound effects, user generated tags and the visual features extracted by visual data mining technology.
4. Allow the user to click on a key frame to initiate video playback from the start of the shot sequence represented by that key frame.
5. Provision should be made for word-level searching of the video's speech transcripts to facilitate the location of relevant shots within the key frame series.
6. Many users in the survey indicated they would like to use another video as input for new queries (Query-By-Example).
7. Use relations between terms.
8. Show related media.
9. Observe usability guidelines.
10. Provide searchers with an overview of popular searches or even personalised views, created on basis of earlier searches.

### 2.2 Transaction log analysis

Transaction logs are the electronic traces left behind by users interacting with the archive's online retrieval and ordering system. For his thesis, academic researcher Bouke Huurnink worked in close collaboration with Sound and Vision on the topic of search in audio-visual broadcast archives<sup>9,10</sup>. One of the results from the transaction log analysis, is that "proper names, of people, places, events, and more, are the most common type of thesaurus term identified in queries."<sup>11</sup>

In the study, three different units of ordering were identified: programs, stories, and fragments. The study observes that

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<sup>6</sup> Oomen, J. Query Logs and their analysis. Deliverable nr. 8.5. VidiVideo Project 2009.

<sup>7</sup> Vidi Video: Improving the accessibility of video. Project website: <http://www.vidivideo.info/> Accessed Nov. 2011.

<sup>8</sup> Multimedia aNalysis for Cultural Heritage. Project website: <http://ilps.science.uva.nl/munch/>. Accessed Nov. 2011.

<sup>9</sup> B. Huurnink. Search in Audiovisual Broadcast Archives. PhD thesis, University of Amsterdam, November 2010. <http://staff.science.uva.nl/~bhuurnin/publications/huurnink10thesis.pdf>. Accessed Nov. 2011.

<sup>10</sup> .B. Huurnink, L. Hollink, W. van den Heuvel, and M. de Rijke. The Search Behavior of Media Professionals at an Audiovisual Archive: A Transaction Log Analysis. Journal of the American Society for Information Science and Technology, 2010. <http://onlinelibrary.wiley.com/doi/10.1002/asi.21327/abstract>. Accessed Nov. 2011.

<sup>11</sup> Huurnink et al., 2010: p. 12

[...] less than one third of orders placed to the archive were for entire broadcasts while 17% of the orders were for subsections of broadcasts that had been previously defined by archivists. Just under half of the orders were for audio-visual fragments with a start and end time specified by the users themselves. The fragments were typically on the order of a few minutes in duration, with 28% of fragments being 1 minute or less. When users manually specified fragment boundaries, sessions typically took more than two and half times as long as when ordering an entire broadcast.<sup>12</sup>

The study also concluded that:

[...] the users of the audiovisual archive] demonstrate a high level of expertise. In sessions where an order is made, users often issue only one query and view only one result before obtaining the audiovisual item. This, in combination with the high proportion of searches on program titles, and on specific dates, implies that the users often perform known-item (or target) search, knowing exactly which audiovisual item it is that they wish to obtain when initiating a session.<sup>13</sup>

### 2.3 Case study

Within the framework of the MUNCH project<sup>14</sup>, Sound and Vision performed a qualitative case study amongst eight Dutch broadcast professionals who frequently use iMMix. Test subjects were observed and interviewed while following a scenario with tasks designed around three factors: nature of the content (audio or video), length and time restraints. They were asked to give a description of their ideal search system, which appeared to be a difficult question and some took the NISV search system as starting point for answering the question. Results showed that the task does not affect the search strategies of the test persons and that the search strategies differ between test persons, not between tasks. We will later see that researchers we've spoken to in the course of the AXES research have a different view on how search assignments influence their search strategies. Below, requirements that came of the survey are listed:

1. General requirements:
  - a. Speed is important, both for searching and inspection of results;
  - b. The system should be stable and reliable;
  - c. The system should have functionalities to play/listen to the results instantly;
  - d. A Google-like interface is preferred;<sup>15</sup>
  - e. The system should be user friendly, intuitive and conveniently arranged;
2. Concerning descriptions:
  - a. Metadata should be 'complete';
  - b. Metadata should contain descriptions of visual aspects of the content;
  - c. Metadata should contain time-codes to enable quick browsing;
  - d. There should be an export functionality for metadata.
3. Concerning search, the system should:
  - a. Have different options for searching;
  - b. Allow searching for visual features;
  - c. Allow searching for sounds and speech;
  - d. Provide speaker identification (face recognition);
  - e. Provide search for shot similarities;
  - f. Provide suggestions for search terms and search guidance;
  - g. Allow search with more than one word;
  - h. Allow search using a thesaurus (synonyms, hierarchical relations, related terms).

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<sup>12</sup> Huurnink et al., 2010: p. 15

<sup>13</sup> Ibid.

<sup>14</sup> W. van den Heuvel. "Expert search for radio and television: a case study amongst Dutch broadcast professionals." Proceedings of the 8th International Interactive Conference on Interactive TV&Video. Tampere, July 2010. Pages: 47-50.

<sup>15</sup> MUNCH: Continuous Access To Cultural Heritage: [www.nwo.nl/MuNCH](http://www.nwo.nl/MuNCH). Accessed Nov. 2011.

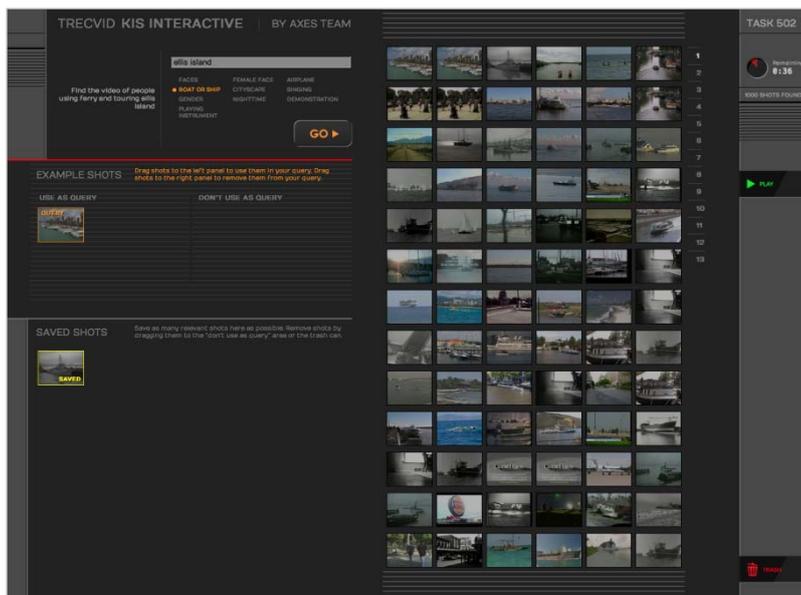
### 3. User requirements studies

Within the framework of the AXES and COMMIT projects, the requirements of this group have been studied by arranging a *panel* consisting of (5-15) broadcast professionals located at different professional environments: NISV, BBC, DW and other (public) broadcast companies. The key requirement for selecting the panel members is that they are professionally involved with searching for audio-visual content for reuse. The aim is to have roughly the same people in the panel during the repeated user requirement studies.

In this first year of the projects, we organised three user requirements studies: 1) the TRECVID benchmark sessions; 2) Observations sessions; 3) Elicitation sessions

#### 3.1 TRECVID benchmark session

TRECVID is an annual global benchmarking activity organized by NIST<sup>16</sup>, designed to promote progress in content-based analysis of and retrieval from digital video via open metrics-based evaluation. By participating in the TRECVID benchmarking activity, the technical WPs of the AXES project wanted to 1) integrate the available technology in AXES; 2) benchmark the technology and desired interface with end users, 3) give professional users an idea of the kind of technology that we are capable of delivering and 4) to elicit feedback from the professional users on the interface. Especially the fourth goal of the TRECVID participation offered a first glance of impressions and requirements of a selected group of professional users.



*Image 1 A screenshot of the user interface as it appeared during the TRECVID known-item search task in the framework of the AXES project.*

During the benchmark session at NISV in September, a first range of evaluation talks was held with a group of image researchers who were invited to the benchmark test.<sup>17</sup> In the Known-Item Search test, approximately 60 % of the participants were involved in material search at NISV, 40% was foreign to the archival institution. In the Instance search, a group of library science students took part.

<sup>16</sup> The National Institute of Standards and Technology in the USA. More info on TRECVID at <http://TRECVID.nist.gov/>

<sup>17</sup> More on the AXES TRECVID benchmark session in D7.1.1 & K. McGuinness, R. Aly, M. Frappier et. Al, *AXES at TRECVID 2011*, TRECVID 2011 - Text REtrieval Conference TRECVID Workshop, Gaithersburg, ML, December 2011

The benchmark provided a very specific environment for the researchers to work with, but throughout the test, a number of highly relevant user requirements for a search environment came forward. We try here (as with the elicitation session later on) to eliminate the comments and feedback specific to the interface, and to withhold those that have an impact on the inner workings of the system.

- A first element is that a search system should make very clear what can and what cannot be used in the search. If Boolean search terms can be used, this should be made explicit. Several users did not understand the inner workings of specific technological options, and not everybody understood the search by query option or the possibilities of concept search.
- A second relevant question is about the inner workings and the search results provided. Users did not understand how the results were aggregated. Was every item that was shown relevant? Or were the results shown in order with most compliant on top? Therefore users did not know how the system worked and were not able to get to learn their system to adjust their search strategy. A search system should provide clear access to the methods it uses to rank search results.
- Adding search terms and filters to refine the query is a basic requirement for the search system. In the model used during the benchmark session, when more search terms were added, more results were shown while users had expected the number of results would decrease:  
*“it wasn’t clear what a combination of terms would bring. Was it ‘and’ or ‘or’? Seems like ‘or’ so the more terms I typed in, the more results but harder to determine which videos had all terms.”*
- Users want to be able to combine words and filter results in order to be able to refine what they are looking for.
- Contextualising the search results is equally important - by showing the metadata, users have a better idea how they should adapt their searches and why the system shows clips based on the search that they did.
- Users also requested the possibility to filter on colour and B&W images and to filter automatically on interior/outdoor shots. This request for technical details returns in the user requirements we assembled during the observation and elicitation sessions.

## 3.2 Observation sessions

The observational sessions were held with 6 professional searchers, two of which work at NISV and four others are involved with broadcast organisations or work independently. In these sessions, we obtained clearer information about the way image researchers work and what the limits are of current search systems they are working with. Secondly these conversations provide a certain number of requirements for future systems.

### 3.2.1 Search strategies

The researchers at Sound and Vision handle requests from (inter-)national producers, documentary film makers and general search inquiries (e.g. from the FOCAL community). Often they search for a specific image, sometimes for a specific conversation or quote.

Researchers prefer to start off their search as wide as possible. Any preselecting is seen as unnecessary, problematic and damaging to good results. The starting points for a search differ widely, as one researcher put it: “every assignment is different”: for every assignment, one has to start fresh and use the tactics necessary to find new materials. The starting point, therefore, is for many researchers not any particular catalogue, but Google and/or YouTube.

A minority of researchers uses YT materials directly in their broadcasts - because of quality issues and rights concerns however, most prefer to research the source material and clear the rights. Part of the requests that the international researchers for Sound and Vision perform, come in as a link to a YouTube video. Sometimes the original content turns out to not even exist in the archive - e.g. tele-recorded live performances).

Some researchers admitted to starting their search for Dutch content in the legacy systems, to

only turn to the more versatile iMMix system for the ordering process. At the news desk, the researchers preferably start their search in their own textual catalogue and turn to iMMix when they knew what to look for and detailed broadcasting info or otherwise. The news desk is a special case, where a small team of ten people is responsible for all audio-visual searches in iMMix. The others either use systems that were in use before the application of the iMMix system or do not perform searches at all, because the learning curve is too high. The news organisation has one search system that contains news items and audio-visual materials and another system that contains only text and background information - both of these were developed in house. The text-based system is preferred by far above all the other systems, as it was built around their specific needs. The audio-visual system is problematic and difficult to search in.

Most researchers have various searches (and various deadlines) running at the same time and therefore need separate lists for separate projects that evolve, expend and thin out over time. This has consequences for the system requirements.

A certain percentage of image researchers is not present or connected to the Hilversum-based media park (many smaller media companies prefer the Amsterdam city environment to the Hilversum media hub, a change that is accelerating with the growth of internet media companies) and therefore has to go through the catalogue via the customer side of the portal to then physically visit Sound and Vision or the company offices in order to watch and select the material.

Another perceived difference in search methods seems to be when either a researcher is looking for shots (stock) shots and fragments, or for longer pieces that contain a story, which can be told through the fragment.

In sketching the profile, needs and requirements for this user group, an important question is what systems they actually use. This lays bare the involvement in the variety of systems (how broad is a search set out), into the technical skills of the searchers and into the perceived technical possibilities of systems already in use.

Needless to say, levels of experience differ, as well as the need or urgency to look over the border and search beyond what's made available in the locally owned search system. In the last decade, moving image collections have started - under pressure of digitisation policies and the pressure of services such as YouTube - to open web access to their (professional) users. At the same time, large commercial footage libraries have invested in online stock footage platforms that make use of top of the line technological tools.

### **3.2.2 Search tools**

NISV's catalogue is called iMMix and is accessible online in various forms:

1. Consumers can access the system through <http://zoeken.beeldengeluid.nl>, where they can perform searches and have access to the same search tools as professional users, but lack the advanced playout features and keyframes.
2. Professionals with a login to the system can only access the DDV system when they are connected to the glass fibre network in Hilversum. This system allows them to preview lo-res proxies of the material and select the parts they wish to use.

When we take a closer look at the user base of the search catalogue iMMix, in October 2011 the list of users consisted out of 1506 user accounts of which 193 belonged to the NISV domain.

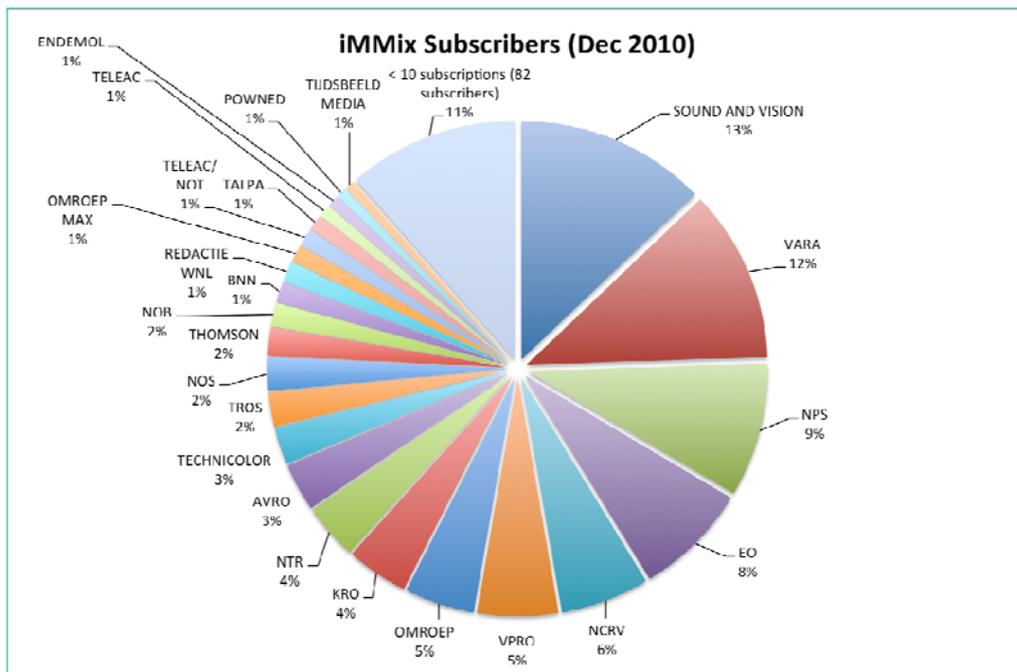


Table 1 Overview of iMMix Professional Subscriptions. Public broadcasting institutions constitute the largest part of the user base.

The iMMix system has a front end and a back-end. The front-end can be accessed from two different platforms: One is open to the public and gives access only to the metadata, the other is accessible only with a login on the Media Park site itself. The researchers at Sound and Vision only use the front-end side for search. The search functionality on the back-end is versatile but complicated and the researchers prefer to use the same tools that the clients work with. In daily operations, this means that they possess the same tools and experiences as the external researchers, although they are aided by knowledgeable colleagues and access to a wider variety of legacy systems, that offer differently structured or broader information than the iMMix system. Sometimes this is due to conversions that haven't been fully completed yet (the process runs throughout the course of the project *Images for the Future*, 2007-2014) or because conversions left out valuable information.

A key in implementing a new system seems to be communication. The iMMix system was installed in 2006 and presented to a community of researchers who'd been working for television for years. Five years later, these researchers still do not have a full grasp of what is or what isn't possible with the system, or about the processes that cause some erratic behaviour. Closer involvement with the search community and regular updates about the statuses (e.g. in the form of a newsletter, forum or regular gatherings) would benefit both developers and the user community. When researchers are approached for the AXES research, they are very keen to share their experiences and to provide input for improving the system.

Although the main sphere in which researchers go about their work is the web and digital content it is important to underline the personal contacts and knowledge that exists about museums. There lies a fundamental difference between a researcher who needs copy (e.g. news desks) and a researcher for a documentary who has the time and resources to delve into the uncharted territory of not yet digitised collections.

When asked for the systems mainly used, the researchers in our response group indicated:

1. International online professional research databases from institutions
  - a. BBC Media Professionals : <http://www.bbcmotiongallery.com/>
  - b. INA Media Pro: <http://www.inamediapro.com>
  - c. Dutch Footage: <http://www.dutchfootage.com/>

- d. DW FESAL
  - e. Imperial War Museums: <http://www.iwm.org.uk/collections/search>
  - f. EYE Film Institute
2. Systems developed in-house
    - a. NOS text + image database
    - b. iMMix - aided by legacy systems (Avail, BAS)
  3. International online professional research databases from commercial providers
    - a. Thought Equity
    - b. Getty Images
    - c. International News Exchange
  4. Online general audio-visual; and search platforms
    - a. YouTube / Google
    - b. Internet Archive

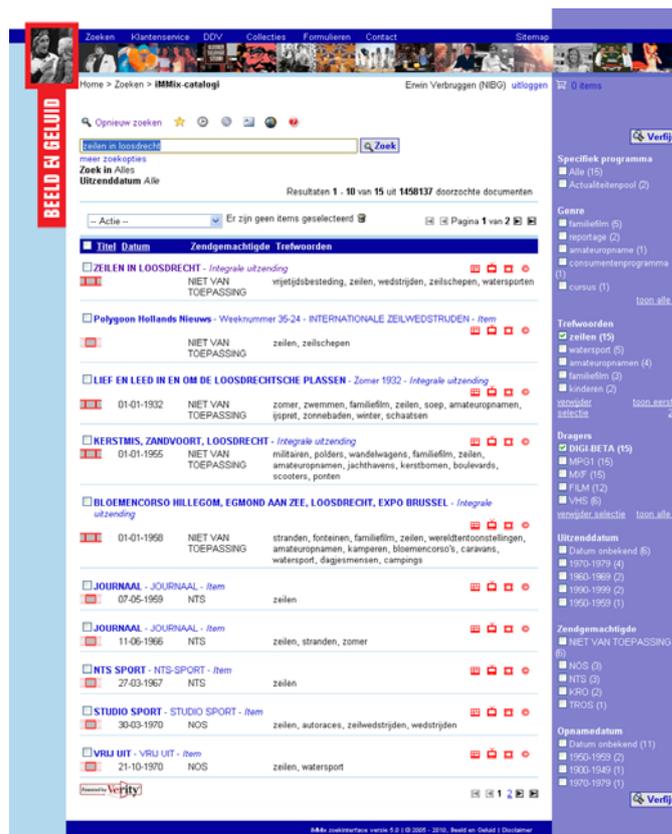


Figure 1 Screenshot of the iMMix Results Page

### 3.2.3 Results observation sessions

During the observational sessions, we sat down with several image searchers to look at the tactics they use in working with the search system - iMMix in most of these cases. Experiences with the system can be divided in 1) experiences that point at a lack of basic functionality in certain case; 2) in comments about the quality of the metadata and 3) technical requirements for future systems.

Most of the researchers already know the catalogue quite well and know what to expect from certain collections or titles. Many of the more experienced researchers have a profound knowledge of the historical moving image domain and know many of the available collections by heart.

#### ➤ Lack of basic functionality

- Much irritation is voiced about the **filtering bar** on the right. Users indicate that in general they do want to be able to filter and refine searches, but the filter bar is both incomplete

- (i.e. it does not allow to filter on less than a decade, does not allow filtering on much technical information) and not trustworthy.
- Users indicate that **search results are not trustworthy** when more than one item is checked. One searcher indicated to never use the filters at all, but to roll throughout the entire list in order not to miss out on any under described images.
- **Quality of the metadata**
- Overall, users want to be able to search on any type of information, both descriptive and technical, which points out the need for a great number of **detailed metadata**, which need to be provided automatically, as this level of detail cannot be provided by human description - and descriptions always differ in the amount of info that is added.
  - The iMMix system makes use of different types of descriptions. Image researchers seldomly know the meaning or intended use of these descriptive categories, which makes the overview of search results confusing.
  - Users indicate that they wish to be able to **refine colour / black & white**, add information about the aspect ratio, **filter out the rights status** and whether or not something is available for free reuse.
- **Technical requirements**
- Physical prohibitions prevent searchers from **sharing the material** in the research process: the catalogue is only visible from the glass fibre network on the media park - searchers remind the era when video copies were given along, but in the digital era this kind of sharing of results has become impossible.
  - An additional characteristic of this prohibition is that users cannot see **the overview** from home (specially difficult for freelance issues). Researchers need a good overview of what they want to order themselves and to be able to enter a specific overview of their search results, with additionally detailed information about the items viewed.
  - Searchers looking for specific shots are highly interested in **shot lists and descriptions on the shot level** and also require a technical division of shots: descriptions of the kind of shot (zoom, pan, ...) and specific time codes in the description of what happens where throughout the programme.
  - A subject that returned from the benchmark sessions, is which search terms to engage for the search and what it is, specifically that combining these terms does. **Boolean search** is a solution for the second issue. The application of a **thesaurus** solves the first problem, as hierarchically search words can be set in a larger context.
  - **Tags and categories**, which are annotated manually by in-house media archivists, are seen as untrustworthy by those who need to use them. The broadcast professionals often don't comprehend why a certain term has been inserted or added.
  - **The date field** is seen as necessary (place & time indication are plenty informative) but not always present. The search machine is experienced as a non-trustworthy system where information is lacking or metadata is entered in very differing ways, due to the historical nature of various converged databases.

The observation sessions taught us a great deal about how the Dutch image researchers go about their work, what the systems are they are using and what the properties of their searches are.

### 3.3 Elicitation Sessions

#### 3.3.1 Prototype system

A *mock-up* is a non-functional prototype designed to illustrate the intended design and functionality of a system. Mock-ups typically illustrate how a particular interaction scenario would take place in the proposed system, and can be used both as design specification documents and as mechanisms to demonstrate potential functionality to users and elicit feedback. The AXES professional mock-up was developed by WP7 as a specification of both the professional as well as journalist user interface and is based upon existing requirement, which were formulated in an early stage and discussed with WP7.

The requirements were used to create an interaction scenario to guide the design of the mock-up. The scenario is based around a broadcast professional that is seeking videos that will illustrate what role

American and Russian political leaders played in the collapse of the Soviet Union during 1989 – 1991. This scenario was selected because it links with the topics defined for AXES, see D1.1. The design goals for the mock-up were: to produce a design that fulfilled the requirements of professional users as closely as possible; to design a system capable of providing professional users with the facilities that they currently find useful in existing systems; to address issues that professional users have with existing search and digital library systems; to be as easy-to-use and intuitive as possible, but still meet the sophisticated needs of professional users; and to create a mock-up that would allow users to conceive how they might interact with new technological possibilities offered by AXES of which they were not previously aware.

This first mock-up has been used in the interviews and group elicitations of all three usergroups. Even though it is not geared for the home and research users, we did show it to them to illustrate the potential and goals of AXES. However, a group elicitation was organized with broadcast professional who provided us with valuable comments on the mockup. These results will be discussed in section 1.

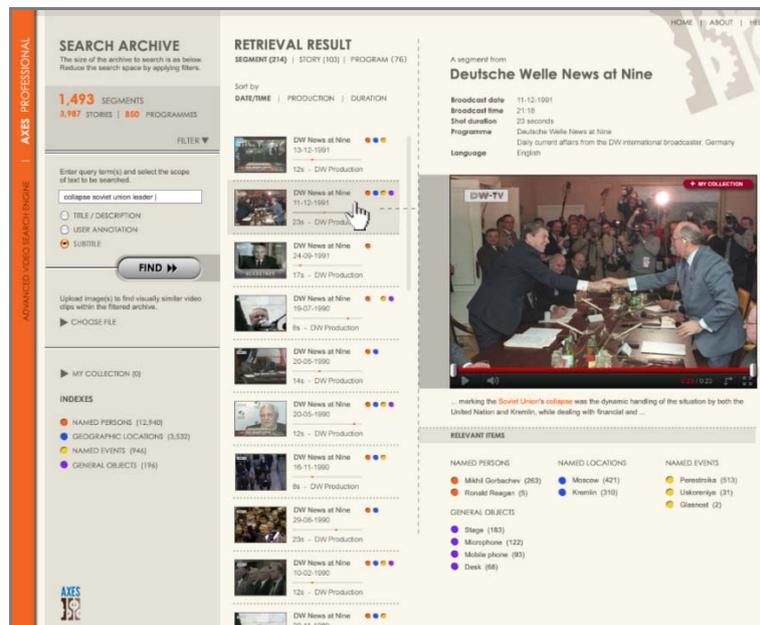


Image 2 A screenshot of the AXES V0 professional user interface mock-up. The design consist of two main areas: the “search archive” and the “retrieval result” area.

Where the observation sessions triggered many remarks about the system in use for most of the researchers (the iMMix system used at NISV), the elicitation session offered a first mock-up version to bounce comments and remarks off about the functionalities presented in the model. As the usability of the system was not testable because the session offered only slides and drawings, the discussion did not involve matters such as technological workings, speed of feedback or the quality of the metadata.

Six researchers participated and indicated that it's of importance for a search pattern to be able to start searching as widely as possible. Any filters applied before giving a search is seen as restrictive and can limit the scope of your search beyond what one really needs for a result. The nature and kind of searches and the variety of assignments the researchers deal with require a broad set of search strategies.

One researcher mentioned that: “each search is different”. Every time a request comes, the searcher has to re-adapt his/her qualities and strategies to find the right tools, the right applications and the right collections that will do the job.

To the point where new functionalities are demonstrated and shown, and especially filtering results is proposed as a strategy, researchers argue that any additional technique is welcome - the more the merrier. If it's technically feasible (and it does not slow down the system), it should be a part of the system. Researchers even argued that they would like to decide themselves what elements to filter on (arguably this could be achieved by providing textual search strings instead of buttons).

Functionalities:

➤ **My Collections:** exists in other systems as well - highly useful to save search results. In the BBC system, for instance, this functionality is called the Bin. A place where search outcomes are collected would also need to be able to be organised according to the various projects researchers work on.



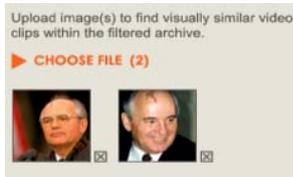
➤ **Editing function:** also present in INA media pro, highly useful functionality. YouTube has an editing system entered in the search functionality. Additionally, a request came up where the *My Collections* part of the system (which is

not part of the mock-up yet) would contain a quick edit function, where one could put the various clips on a timeline. The advantage of this would be that researchers can decide - before the ordering process has begun - which clips formally go together, as a sort of premix.



➤ **Save search:** The discussion about My Collections and saving search results also brought up the comment that a search process should be able to be saved - and every step along the way should be reversible. As many researchers find some functionalities unclear, they like to be able to undo the filters and search strings they piled up in order to come back to the exact same original result.

➤ **Search based on image:** found very useful - several searchers indicated that they often search based on received YouTube clips or with pictures. The recently released Google Image Search is a feature often used and found very usable.

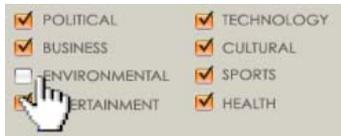


➤ **Colour indication:** participants highly estimated the functionality which shows what search topics are present. The colour function that

indicates what category they belong to is seen as a useful feature - although others commented it would be difficult to involve or categorize an entire thesaurus. Researchers also wondered whether a combination of these terms would be possible - and whether or not it is not easier to do so by means of using text in the search box.

RELEVANT ITEMS		
NAMED PERSONS	NAMED LOCATIONS	NAMED EVENTS
Mikhail Gorbachev (263)	Moscow (427)	Perestroika (213)
Ronald Reagan (8)	Kiev (310)	Ukraine (21)
		Glenn (2)
GENERAL OBJECTS		
Stage (183)		
Microphone (132)		
Mobile phone (93)		
Clock (68)		

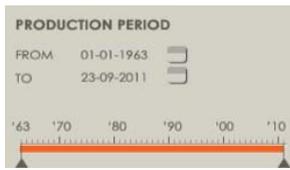
➤ **Filters:** much debate ensued about the filtering categories. In the mock-up, filters are categorised under broad umbrella terms ("sports, politics") - on which the researchers commented that a) you would never apply a filter before starting your search and b) the origin of these categories is vague: who has to decide which is what? Often they find the best results in unexpected categories. Some argued that it would be



useful for some searches where one really does not need any sports activity, for example. This type of filtering depends largely on the type of description within the archive.

When it comes down to filtering, researchers do want to be able to filter on any kind of either factual or technical information: the kind of shots, black or white, the language, the rights situation, the original source, the entire credit roll even. Question is whether this should be provided in the interface or solved by textual strings (e.g. Apple search, Gmail search). One researcher suggested a toolbox for professional researchers where they get an "under the hood" overview of what is or what isn't activated.

- **Timeline slider:** compared to the timeline slider in the BBC system, which has been working well for over 10 years. Some worries exist about what kind of date you're searching for (recording date vs broadcast date). In television search, the former is way more important. Some researchers requested the option to search for a specific time of day (i.e. where an item was only in the 12 0' clock news.)



- **Geographical coordinates:** some researchers use geographical search and much prefer searching according to region - a function where a map is shown (i.e. Flickr, Google Earth) - which should take away the confusion about local level search or wider area search (Rotterdam vs Netherlands versus Europe, for example). Again, it is of key importance how the database has been filled, as location can mean both where it has been recorded, what's the subject or where the broadcaster is located.

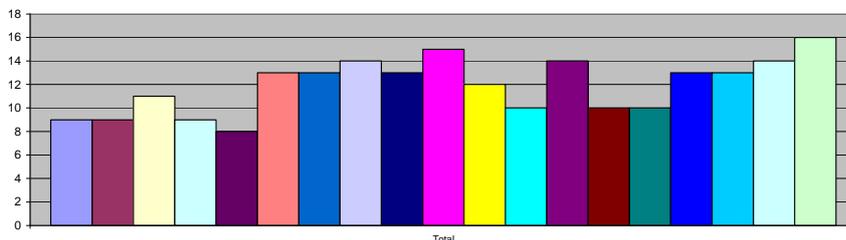
- **Thesaurus terms:** should be visible and searchable (comment: thesaurus spelling not always used in iMMix) to show both the local and international version of names and places.

Broadcast date	11-12-1991
Broadcast time	21:18
Shot duration	23 seconds
Programme	Deutsche Welle News at Nine Daily current affairs from the DW international broadcaster, Germany
Language	English

- **Technical information:** researchers want to have an overview of the availability of the material: what formats and what quality is available for use.

### 3.3.2 Case study requirements

At the close of the elicitation session, users were asked to rate the importance of the case study requirements that were defined in the framework of the MuNCH project. The image below shows an overview of the results that come out of this user group's questionnaire (6 participants, 2 of which connected to one of the broadcasters, two of which employed by the archive and two of which who perform their searches independently).



- Speed is important, for input, searching and retrieval
- The system should have functionalities to view, play, listen to the results instantly
- The system should be stable and reliable
- The system should be flexible and powerful, yet convenient, user friendly and intuitive
- Allow search on date and time, showing most recent updates first
- Allow search for individual shots and shot similarities
- Allow searching on images and image quality
- Allow searching for sounds and speech
- Provide person/speaker identification (voice and face recognition)
- Allow domain-specific searches
- Allow search on location
- Allow search on a specific event
- Provide suggestions for search terms and search guidance
- Allow multi-word and stem-searching
- Allow search using a thesaurus (synonyms, related terms)
- Allow index/hierarchical searching
- Allow search on source reliability and on rights restrictions
- Allow search on old vs. new/original content
- Allow search on fact vs. opinion

## 4. Conclusions Broadcast professionals

Based on these first requirements studies, we can give an overview of the requirements for the Broadcast professionals.

### 4.1 Requirements search process

Requirements	Based upon	Related project or tool
Filtering should be trustworthy and repeatable	Elicitation	iMMix
Provide multiple project functionalities within My Collections	Elicitation	Mock-up
Provide possibility to filter any type of metadata element	Elicitation	Mock-up
Provide premix editing function	Elicitation	YouTube Remix
Provide save search functionality of multiple search steps	Elicitation	iMMix, Mock-up
Store search results overview with detailed information about the items	Elicitation	BBC bin, Mock-up
Allow search with more than one word	Case study	iMMix, MuNCH
Allow searching for sounds and speech	Case study	iMMix, MuNCH
Allow searching for visual features	Case study	iMMix, MuNCH
Combine different information channels	Query Log Analysis	iMMix, VIDI-Video
Have different options for searching	Case study	iMMix, MuNCH
Provide searchers with an overview of popular searches or even personalised views, created on basis of earlier searches.	Query Log Analysis	iMMix, VIDI-Video
Provide speaker identification (face recognition)	Case study	iMMix, MuNCH
Provide suggestions for search terms and search guidance	Case study	iMMix, MuNCH
Show related media	Query Log Analysis	iMMix, VIDI-Video
Specification of fragments should be made effortlessly	Transaction Log Analysis	iMMix, VIDI-Video

Use another video as input for new queries / Provide search for shot similarities	Query Log + Case study	iMMix, MuNCH
Use relations between terms	Query Log Analysis	iMMix, VIDI-Video
Allow multiple filters to be combined	TRECvid	AXES TRECvid UI
Combine textual and filtering search strategies	TRECvid	AXES TRECvid UI
Provide filtering combinations with multiple relevant items	Elicitation	Mock-up
Provide hierarchical search	Elicitation	Mock-up
Provide image-based search	Elicitation	Mock-up
Search on any type of information, both descriptive and technical	Elicitation	Mock-up

#### 4.2 Requirements presentation results in user interface

Requirements	Based upon	Related project or tool
Make clip browsing and ordering process available online	Observations, Elicitation	iMMix
Click on a key frame to initiate video from that point onwards	Query Log Analysis	iMMix, VIDI-Video
Instant playout / browse within a given video	Query Log + Case Study	iMMix, MuNCH
Colour indication of relevant items in search results	Elicitation	Mock-up
Show available metadata	TRECvid	AXES TRECvid UI
Visual interface for search on Geographical coordinates	Elicitation	Google Earth, Flickr
Observe usability guidelines / provide a clear, user friendly, intuitive and conveniently arranged interface	Query Log + Case Study	iMMix, MuNCH, Google Search, Jakob Nielsen
Filter automatically on interior/outdoor shots	Observations	iMMix
Filter on aspect ratio	Observations	iMMix
Filter on colour and B&W images	Observations,	iMMix

	Elicitation	
Filter on reuse availability / Rights status	Observation, Elicitation	iMMix, Mock-up
Provide descriptions on the shot level with time code	Observations	iMMix
Provide option to search for a specific time of day	Elicitation	Mock-up
Provide reliable date information	Elicitation	iMMix
Provide technical carrier information: what formats and what quality are available for use	Elicitation	Mock-up
Provide technical descriptions of the kind of shot (zoom, pan, ...)	Observations	iMMix
Thesaurus terms should be visible and searchable	Observations, Elicitation	iMMix, Mock-up
Allow search using a thesaurus (synonyms, hierarchical relations, related terms).	Case study	iMMix, MuNCH
Clear marcation of entities, themes and events	Query Log Analysis	iMMix, VIDI-Video
Descriptions should contain visual aspects of the content	Case study	iMMix, MuNCH
Descriptions should contain time-codes to enable quick browsing	Case study	iMMix, MuNCH
Export function for metadata	Case study	iMMix, MuNCH
Metadata should be 'complete'	Case study	iMMix, MuNCH
See and access items in their broader context	Query Log Analysis	iMMix, VIDI-Video
Word-level searching of the video's speech transcripts within key frame series	Query Log Analysis	iMMix, VIDI-Video

### 4.3 Requirements additional features

Requirements	Based upon	Related project or tool
Provide clear access to the methods	TRECVID	AXES TRECVID UI

used to rank search results		
Provide clear explanation for the use of categories	Elicitation	Mock-up
Provide clear search instructions (manual or help pages)	TRECvid	AXES TRECvid UI
Speed	Case study	iMMix, MuNCH
Stability, reliability	Case study	iMMix, MuNCH

