

**Monday May 3**

**This happened at the Klingenberg Cinema:**

**1. George Blood**

**Safe Sound Company**

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Philadelphia, PA 19118-3309

**U.S.A.**

**“Bits is Bits, Right? Guess Again”**

Much has been discussed of the long-term preservation challenges of digital information: preservation of the bits, and renderability of the information into human understandable form within the changes/advances in technology and file formats. But little investigation has been done to the authentication of audio files.

While MD5 checksums enable users and system administrators to certify the accuracy of files through time and migration, what assurance is made that the digital data stream from the analog-to-digital converter is being delivered to the file?

This presentation will share results of systematic tests made while certifying new digital audio hardware and software for use in audio preservation. Many frequently used hardware and software products were checked, and very few either work well together or consistently deliver the data stream that was fed to them from the analog to digital converter.

Details of the testing procedure, discoveries of subsequent tests and the implications for preservation are discussed. An application to perform these tests simply and quickly is in development and should be available before JTS. It will be open source and freely available.

**2. Mike Casey**

Associate Director for Recording Services

Archives of Traditional Music

Indiana University

Co-Chair, ARSC Technical Committee

Manager, *Sound Directions* Project at Indiana University

**U.S.A.**

**Scaling Up: Using Parallel Transfers in Research Archives to Increase Audio Preservation Efficiency**

Many archivists believe that a 15-to-20 year window of opportunity exists to digitally preserve audio and video collections. After that, the combination of degradation and obsolescence will make preservation transfer either impossible or prohibitively expensive. Given the size of existing collections, it is becoming clear that the old model of one engineer transferring one recording at a time will not get the job done within this timeframe. For

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example, the Archives of Traditional Music at Indiana University estimates that it will take at least 60 years to preserve its collections in this way.

Motivated by these concerns, *Sound Directions* project partner Indiana University is conducting research into methods for increasing the efficiency of audio preservation transfer work within the context of a research archive using mostly off-the-shelf hardware and software.

One tactic is to use parallel transfers—also called simultaneous or multiple transfers—of more than one analog recording at a time. Although widely used by broadcast archives with largely homogenous collections, parallel transfer methods have not typically been employed by research archives with holdings that are more heterogeneous in nature and with long-term preservation as their primary concern. *Sound Directions* research has focused on identifying the risks and benefits of this method based on actual transfer work in order to develop safe, high-quality applications for research archives. Topics to be covered include:

- Risks associated with parallel transfers
- Methods for mitigating risk through the selection process and through monitoring
- Techniques for monitoring all sources at all times using varying levels, fades, and automated switching
- Use of LED's to quickly identify playback decks to assess problems
- Technical issues and problems with the capture of audio from reverse playback of tapes
- Efficiency gains from the use of parallel transfers
- Unexpected hazards of a custom 1:1 transfer workflow and corresponding advantages of parallel transfers

### **3.Peter Fornaro**

#### **Monolith – migrationless long term digital storage: A method to overcome technological obsolescence in audio visual archives**

By Peter FORNARO and Rudolf Gschwind, Imaging & Media Lab, University of Basel  
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Rapid advances in information and communications technology has most certainly improved opportunities for information access and knowledge distribution. Contrariwise, technological progress has become an adversary player for long term archiving as data carriers, the machinery for access and data formats change: Digital long-term storage solutions lack the requirements of financial and technological transparency.

Paper or parchment books have survived centuries – but how does the 21<sup>st</sup> century's generation cope with today's growing digital, and genuine digital born data? Especially in film archives the digital long term archival of digital assets is a challenge that can be solved by the presented approach of storing digital data on photographic material?

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### **Content**

PEVIAR and Monolith, have been research projects at University of Basel that resolve the shortcomings of today's digital storage solutions: Using film material as data carrier for digital barcode, the access is provided by standard optical scanners, without dependence of proprietary hardware. Data decoding is based on well-documented software. And the digital data carrier itself last up to centuries.

The presentation will focus on two subjects:

First, we will give a short technological insight into the method and the added value of the bits-on-film technology.

In the second part, will share our experiences within our practical work, the long-term storage of digital data in archives. We will focus on the comparison of costs, quality and security aspects. As for the data owner, we will address critical points such as confidentiality, data integrity and authenticity and outsourcing possibilities. We will show examples of the quality of the bits on film technology and compare them with conventionally scanned images, e.g. images obtained from re-scanned colour-separations as used in movie-film archiving.

### **4.Jim Lindner**

Senior Media Preservation and Technology Consultant

Matters Media

**U.S.A**

### **Stained glass**

Parallels in Preservation: Analogies in the Conservation of Stained Glass and AV Media

We are not alone. The preservation community for AV and Electronic media can learn a great deal by looking at some of our sister fields and issues relating to the conservation of other cultural objects. This presentation will look into a "new" old area - the preservation of stained glass windows. In fact stained glass windows and film share many similarities not considered by the AV community.

Stained Glass Windows were arguably the first media type to tell a story with light, are in a larger than human aspect ratio (truly WIDE screen "Cinema"), use the transmissive characteristics of different glass to invoke feelings and paint with light in different ways to tell a story. Some glass was hand painted and tinted and is in layers as was early cinema. Some colors were difficult to create in glass, as they were (and are) in film. Stained Glass and Film are both Art Forms.

Stained glass windows are fragile, become brittle over age, can lose their imagery, are expensive to conserve, require specific expertise to repair and special tools and training, are effected by the atmosphere and contaminants and exposure to wide extremes of temperature... and there is even controversy over different conservation techniques. Does this sound familiar? Surprisingly some of the maladies effecting stained glass windows are similar to those in film and even electronic media.

In fact stained glass windows are supported by a "matrix" that over time deteriorates which causes buckling of the windows. There are support systems to hold the matrix in place which sag over time, the solution of which is sometimes to replace the matrix and support system (which can be controversial because the appearance of the window can be altered).

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Does one "restore" a missing or damaged pane of glass in a large window by trying to recreate it or does one simply leave the pane clear or substitute glass that is of a similar color but does not try to duplicate the original.

These are many of the same issues facing film for both Analog and Digital preservation. Even the lead that makes up the window matrix (which can be thought of as base film stock) is subject to chemical deterioration over time. Issues such as problems with obsolete and hazardous materials are shared by both disciplines.

This presentation will look at some of the analogies between Stained Glass and film by examining a specific stained glass conservation project in detail. The presentation will focus on the conservation of the stained glass windows in St. Mark's Lutheran Church located in Middle LaHave, Nova Scotia, Canada. While less than 110 years old, these windows are exhibiting some of the very same issues that we commonly see in film deterioration - but in a different context. The presentation will discuss some of the common practices in the field of stained glass conservation and discuss both the specifics of the project at St. Mark's as well as pointing out analogies in some of the issues facing the conservation of film.

### **5.Arne Nowak**

Project Manager Archives  
Fraunhofer Institute for Integrated Circuits,  
Germany

### **Digital Archiving of Audiovisual Material – Pilot Projects in Europe**

The Fraunhofer Institute for Integrated Circuits IIS in Erlangen, Germany, has developed a concept and a prototype of a digital film archive system together with Cinémathèque Royale de Belgique and other partners within the European Commission-funded EDCINE project. The project ended in June 2009 but development did not stop. In autumn 2009 Fraunhofer IIS teamed up again with the Cinémathèque, the Danish Film Institute, the Finnish National Audiovisual Archive and the British Imperial War Museum to use the concepts, formats and technologies in to work jointly on pilot projects to bring the developments from the scientists' laboratories to the archives.

The proposed presentation describes the general approach for the practical realization of a digital film archive system and the progress of work on the pilot projects at the time of JTS2010. The archive system will be based on the OAIS model and use JPEG2000 and MXF as storage formats.

The goal of the pilot projects is to provide the archives with small complete solutions that include all components that are needed to operate a digital film archive, starting from digitization and preparation workflows over ingest methods and automated transcoding of input formats to compressed storage formats and the management of storage and the archive itself. The system will provide different possibilities for access by archive staff and clients of the archives. The solutions will be designed to be scalable so that the systems can grow with the demands of archives and their clients. The presentation will include information on the experiences made in the different phases of the realization of the archive system and give hints on which routes the authors think should be taken and which ones should better be avoided.

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### **6.Jørgen Stensland**

Director of Consultants  
Film & Kino  
Norway

#### **Digitalization of Norwegian Cinemas – First Complete national digitalization scheme**

Film & Kino, the Norwegian interest organization for cinemas, announced in June 2008, the world's first non-commercial complete national digital roll out with agreements with Twentieth Century Fox, United International Pictures (the local distributor for Paramount Pictures and Universal Pictures in Norway), Walt Disney Studios Motion Pictures International, and Warner Bros. Pictures International.

This complete digital roll out will transform all of Norway's cinemas, big and small, to modern DCI-compliant digital cinema houses. The roll out will start in early 2010 after the completion of public tenders for the procurement of equipment and services required for the digitization process. The agreements will help facilitate the financing of the conversion to digital cinema. The costs will be shared between distributors, cinemas and Film & Kino. The transition to a digital projection platform will additionally provide the foundation for 3D exhibition capability, exhibition of alternative content, alternative use of the cinema as for example use of the cinema to view archived films and other special interest shows and improved flexibility in distribution and exhibition operations.

Some very important topics had to be addressed in this process, and will be discussed in the presentation:

- Pilot projects
- Research
- Core economic model
- Technical specifications
- State aid issues
- Added value tax
- Agreements with distributors
- Political support

### **7.Erlend Jonassen**

Norwegian Film Institute  
Norway

#### **Digital cinema – bringing film classics back to the cinema screen**

Digitization of the film legacy of the last century is not mainly a question of preservation. Films produced on film are in the years to come best preserved on film. But digitization to high quality files opens opportunities for giving a wider audience access to the

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films screened in cinema in a way that could be close to the original experience. It is now necessary that the film archives include digital screenings according to DCI-standards among their objectives. This means that scanning of restored film should be done in at least 2K resolution to open up for mastering of the films to a JPEG200 DCP (Digital Cinema Package). Realized in this format the films could in the future be screened in any cinema according to the new standards for digital cinema.

In addition to giving a much wider audience access to film classics without using precious 35mm prints, digital cinema will take the experience of a century of film history back to the cinema screen after a period when these films have been very much available in DVD. In Norway The Digital Cinematheque has been established, now giving digital cinematheque screenings in seven cities all over Norway once a week. This has now been running for one and a half year and has given us a lot of experience – and challenges.

This work raises a lot of important issues:

- What is at present available of the film classics for digital cinema screening and at which cost?
- What is done to make more films available, by the studios in Hollywood, in Europe, e.g. the EU-project Europe's Finest, by the film archives?
- Important technical consideration: HD CamSR, 2K, 4K. The question of subtitling, the possibility to have translated intertitles in original form, the questions of keys (or not)
- What should and could be the role of the film archives in this work?

### 8. David Pfluger

Ph.D. for Memoriav

Basel

Switzerland

### 16mm Reversal Material in the Light of the Transfer to High Definition Video.

The question, how a 16mm film image can be reproduced as a digital image is of great interest as 16mm film constitutes a significant part of the global film heritage. Similar to other film formats there is a vivid discussion going on about which technical properties of the digital image are needed to reproduce the original in an appropriate way. Many are focussing on the resolution but the opinions differ a lot.

The problem becomes even more complicated by the fact that different emulsion types show different properties, which means that there cannot be a general rule. The reasons for the differences of the quality can be the technical generation of the film stock, or the field of use for which the emulsion was created.

Today the broadcast world becomes familiar with digital postproduction and digital broadcasting of film. As transfers become faster and less expensive, the mass transfer of 16mm archives becomes frequent. Several studies about 16mm transfer to HD have been made mostly with a focus on negative film stock. Reversal material is mentioned as marginal and often it is pointed out that it is of "bad" quality. The reasons for this judgement are rarely ever explained.

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A closer look is necessary because of the fact that 16mm reversal material has been a material of major importance for newsgathering. TV stations stack thousands of meters in their archives. If we want that this visual heritage is can be re-used in an efficient way and if digital preservation scenarios are to be created, the properties of this emulsion type need to be known. This knowledge also helps to get a maximum of data out during the transfer process and at the same time minimizing the effort.

This study is confined to 16mm reversal emulsion types which have been used by Swiss TV stations. It sticks to the technical facilities owned by Swiss film postproduction companies. Still the results are not limited to Switzerland. We will compare the performance and limits of transfers in SD and what transfers in HD can achieve. At the same time we will consider the usual workflows of the local postproduction.

We will show:

- A comparison of transfers in SD and HD with different brands of machines.
- The importance of the different technical parameters.
- The usual workflows and their problems and key steps.

The aim is to get an idea of the current technical properties of 16mm reversal film by understanding the role of external factors in the transfer process.

We try to get an overview and to become able to ask the right questions for individual solutions. It is studied where the exploitation for TV broadcast needs different solutions to archival demands and where compromises can be found.

### **9. Fumiaki Itakura**

National Film Center,  
The National Museum of Modern Art, Tokyo,  
**Japan**

### **Akihiro Seino**

IMAGICA Corp.  
**Japan**

**Katsuhisa Ohzeki,**  
FUJIFILM Corporation,  
**Japan**

### **Digital restoration and preservation of GINRIN (Toshio Matsumoto, 1955) with NEW black-and-white separation film for digital intermediate.**

In this presentation, we will discuss a few different workflows of the digital restoration and preservation of GINRIN which National Film Center conducted in collaboration with IMAGICA and FUJIFILM. We will also focus on the indispensable technical specificities of B/W separation films newly designed for DI process and used in this presentation work in terms of resolution, light scattering and adaptability for film printer/recorder.

Produced in 1955, GINRIN marks one of the early achievements in the history of Japanese experimental cinema. The film was directed by Toshio Matsumoto, a pioneering experimental filmmaker with the scores of musique concrete by Toru Takemitsu and with the special effects by Eiji Tsuburaya of the Godzilla fame. Having been thought lost for a long

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time, the film was discovered in 2005 in the form of the original negatives of its English-titled version. But the color of this film was badly faded.

We first restored the film in the following process: 1) a color master positive was made from the original negatives, 2) the color master positive was scanned at 4K resolution and restored at 2K, 3) the restored data was recorded on 35mm color intermediate negatives at 2K to make a 35mm print (Film1). In order to compare the image qualities and to confirm the advantages of new B/W separation films designed for DI process, we made the following other two different 35mm prints. First, digital restored data was separated into R, G and B channels and recorded on the new B/W separation films. These separation negatives were recombined by use of an optical printer to make a 35mm print (Film2). Second, the separation negatives were scanned and digitally re-combined, and the data was recorded on 35mm color intermediate negative to make a 35mm print (Film3).

Although it was confirmed that each restored image of Film1, Film2 and Film3 has little differences of image quality; we found that the image preservation on the new B/W separation film has advantages in terms of resolution and color reproduction compared with the preservation on color intermediate film.

### **10.Rudolf Gschwind**

Imaging and Media Lab University of Basel  
Bernoullistrasse 32 4056 Basel,  
**Switzerland**

#### **Dust BW: Detection of dust and scratches on photographic silver halide (black/white) material by polarized dark field illumination**

**Rudolf Gschwind**

**Sabine Süssstrunk**

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**Bernard Besserer**

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**France**

The main topic of this presentation relates to digital reconstruction and permanence of photographs (slide, negative) and motion-picture films by digital image processing. Photographic materials are rather unstable compared to other cultural objects. The degradation is much faster than those of paintings, sculptures or architecture. There are several factors that limit the permanence of photographic material: In color material the dyes bleach with time, in b/w material the finely spread silver particles are oxidizing and hence discoloring, the film base itself (cellulose acetate / nitrate) degrades and shrinks, and finally mechanical wear and abrasion produce dust and scratches.

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The goal of this project is to investigate a solution for one particular problem, the **removal of dust** and if necessary scratches on any kind of scanned transparent photographic material (film, still photographs, b/w and color) by detection of dust through a new optical scanning system consisting of polarized dark field illumination. Through this approach the diffracted light of the fined grain silver can be suppressed whereas the diffracted light of dust and scratches is still visible (see Figure 1).

What is new about it is that the combination of these two techniques has never been done before, i.e. we use physical knowledge on light polarization, scattering, dark field illumination, emulsion composites in an innovative way to solve an old problem in photography, namely how to get rid of dust. Applying appropriate threshold techniques that combine dark field image and regular scan and image-processing techniques (in-painting) to remove dust will result in restored images that appear correct and natural.

### **11. Thomas Dugeon**

#### **Matteo Trelani**

INA, Institut national de l'audiovisuel  
France

#### **Context sensitive archiving of videos on the web**

Authors: Thomas Dugeon, Valentine Frey, Jérôme Thièvre, Matteo Trelani

In an effort to extend its current audiovisual collections, Ina has for several years studied the options of archiving audiovisual-related contents on the web. Although the initial focus was on video and audio contents only, it was soon admitted that whole websites needed be archived as part of the user experience.

The interest in archiving websites lies not only in isolated text, image or video contents. It resides instead in the reciprocal influence of one upon the other. On the other hand, from the point of view of meaning, an on-line video archive offers a context for which it is difficult to separate the audiovisual item from the elements around it. We can thus hypothesize that context around audiovisual contents published on the web, brings about an alteration in the meaning and value of published videos. This paper will study an example where the same video, published in two different websites, has a different signification or bias. Thus, web archiving at Ina does not only aim at preserving a supposedly original document but its goal is also to retain the whole experience in accessing documents in a given context and at a given time.

In a web environment, audiovisual and digital media are now easily combined in one same entity. The difficulty lies in preserving ephemeral contents: codes, formats and the electronic equipment required to read them are numerous and varied. Contents are mashed up, swapped, linked ending up in a multitude of variants, the origin of which is unknown or hard to monitor. Digital archivists are confronted with many difficulties, such as how to identify which content to preserve as well as ensuring integrity and authenticity of the archive.

Within the legal deposit framework, in February 2009, Ina has launched full scale

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archiving of over 5000 audiovisual-related French websites. Tools and methods have been developed to undertake this new mission. Archiving websites requires an entirely different approach from the one used for radio or TV archiving. Indeed, the web is a very inconsistent and versatile media as compared to broadcast. Standards, with new formats and protocols appear just as fast as they disappear.

It is no longer a matter of receiving a broadcast stream but a process of discovering, extracting and following hyperlinks throughout heterogeneous formats, in an effort to collect a whole entity: the website. The sheer size of the web also has to be taken into account, the bulk of the archive amounts to billions of files each year. The dynamic dimension of the web and the high update frequency of most sites highlights the issue of redundancy and content consistency. Therefore storing and accessing web collections has been addressed with a new file format specifically developed and allowing for more than a 90% size compression.

**END.**