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Audiovisual documents -
Between information carriers and objects of art
or:
Revisiting IASA-TC 03

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Digital Philology for the
Preservation of Multimedia Archives
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International Association of Sound
and Audiovisual Archives

Internationale Vereinigung der
Schall- und audiovisuellen Archive

Association Internationale d'Archives
Sonores et Audiovisuelles

Asociación Internacional de Archivos
Sonoros y Audiovisuales

iasa

Technical Committee

Standards, Recommended Practices and Strategies

The Safeguarding of the Audio Heritage: Ethics, Principles and Preservation Strategy

IASA -TC 03

<http://www.iasa-web.org>

Version 3, 2005,
presently under review

Embedment of TC 03:

Pre 1990 - the classical preservation paradigm

Change of preservation paradigm around 1990: from carrier to content preservation

Consolidation of digital preservation in the 1990s

The challenges of audiovisual preservation

- unstable materials
- machine readable documents (except photographs) threatened by format obsolescence and unavailability of dedicated replay equipment
- replay = access implies deterioration: high for film and mechanical, less for magnetic carriers

Early concerns focused on instability on nitrate film

First study of the chemistry of audio carriers only in 1959

Format obsolescence and lack of replay equipment was originally not a major problem:

- film formats extremely stable
- cylinders 1880s - late 1920s
- coarse groove discs: late 1890s – mid 1950s
- micro groove discs: since late 1940s – presently revived
- magnetic tape: since mid 1930s/late 1940s – now rapidly vanishing

Low sophistication of early formats permitted repair, even construction of new replay equipment for historical formats - **permitting better reproduction than original devices**

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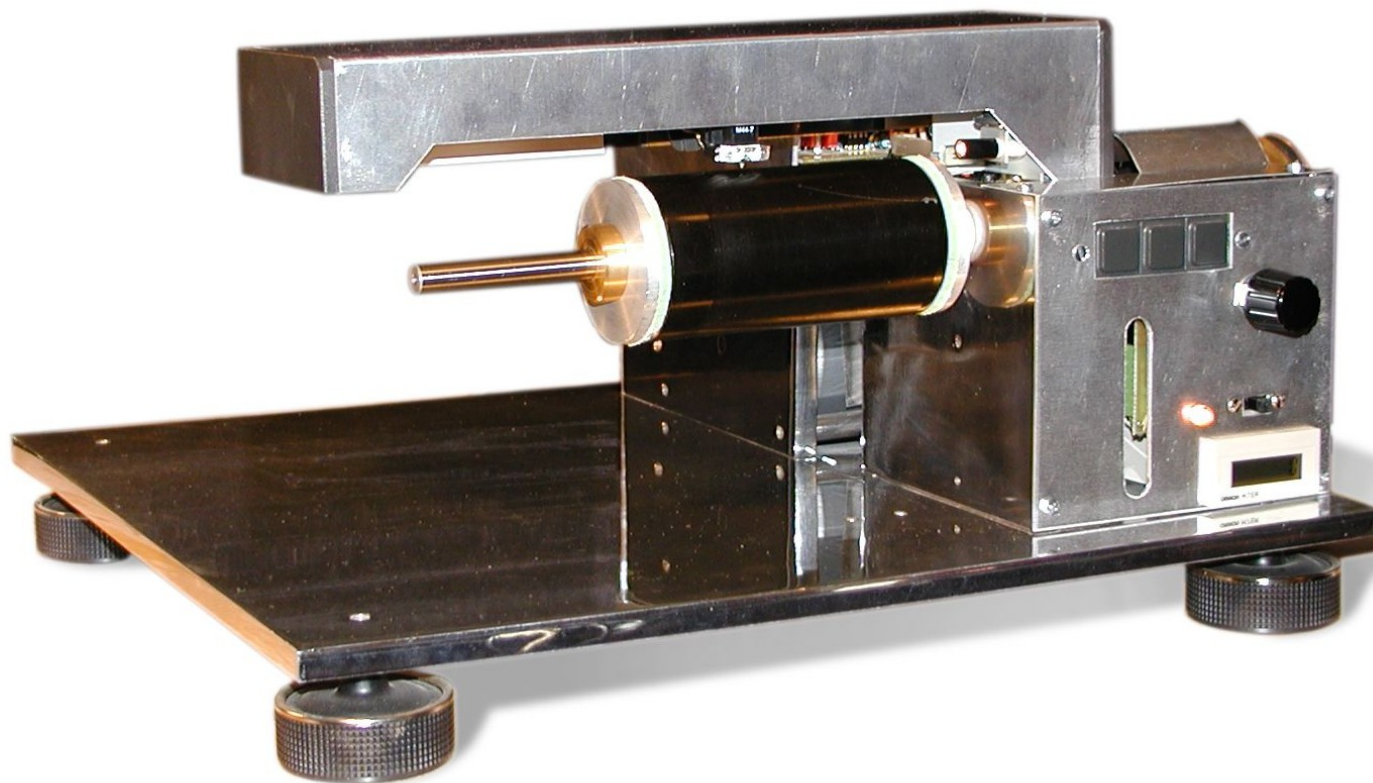
PRESERVATION AND STORAGE OF SOUND RECORDINGS

By A. G. PICKETT and M. M. LEMCOE



Cylinder player Type IV

Design and construction: Franz Lechleitner, Vienna Phonogrammarchiv



Archeophone

Design and construction Henri Chamoux



Classical preservation paradigm: archives and museums preserve the **objects** placed in their care

- Archives and museums are repositories of **originals**
- **Copies** are useful **working tools**, indirectly assisting the preservation of originals by minimising their handling
- Copies are never fully replace originals

Audiovisual archives followed this classical preservation paradigm by

- keeping (two) “untouchable” archival masters under ideal climatic conditions
- accessing records only through working copies

Situation of the 1980s

Arrival of digital audio and video

Expectation: stable digital formats optimised for archival purposes

However, the opposite happened: life cycles of formats became ever shorter

Several new formats vanished from market soon after their introduction

Consumer market products entered professional world, e.g. R-DAT

Change of paradigm started May 1989 UNESCO meeting:

Sooner or later, ALL carriers will decay beyond retrievability → optimisation of carrier preservation would ultimately be in vain

Sooner or later, ALL carrier formats would also become obsolete

As formats become obsolete, spare part production and availability of replay machines in operable condition will fade

Because of high sophistication, rebuilding of new equipment would be impossible, once serial production has seized

Even carriers in excellent condition will become useless

Consequently:

Long-term preservation can only be achieved by digital (= lossless) subsequent copying of contents

Analogue contents have to be digitised first

Digital preservation management (data integrity checking, refreshment, and migration to new preservation platforms) must be automated

First public debate
Joint Technical Symposium
Ottawa 1990

(mixed perception....)

ARCHIVING THE AUDIO-VISUAL HERITAGE

THIRD JOINT TECHNICAL SYMPOSIUM



Tonmeistertagung November 1992, Karlsruhe:

Auf dem Weg zum “ewigen”, vollautomatischen Schallarchiv

Similar idea was proposed by EMT

Emphatic debate on data reduction (“compression”) for archival files: archival principles against pragmatic/commercial considerations (IASA-TC has banned data reduction for archival files in September 1992)

Issue of concern until mid-1990s, when linear, uncompressed archiving was generally accepted – supported by rapid decay of storage costs

Slogans of the early 1990s

Preserve the file, not the carrier

From the “eternal” carrier to the “eternal” file

1992/93 ARD (Südwestfunk Baden-Baden) in cooperation with IBM: first pilot project to develop a “Digital Mass Storage System” for sound archiving (Albrecht Häfner)

ARD Archiv-Arbeitsgruppe (chair Andreas Matzke) decides on the “Lineares Funkhaus”: no data reduction in production and archiving, only for transmission
“Data reduction is audio destruction” (AES Paris 1995)

EBU decides to extend the Wave format to BWF

IRT (Institut für Rundfunktechnik) designs “Quadriga”, computer aided ingest station for A/D transfer

Incentive for European national/public broadcasters: Reorganisation of radio production and using archives as assets against private broadcasters

In Europe, by the later 1990s, sound recording, archiving, and postproduction has become part of the IT world

Broadcast sound archives had taken the lead...

As IT equipment and storage costs came down towards
2000 and beyond

- national sound archives
- research archives
- video archives

followed

Digital Mass Stores: originally near-line tape robotic systems, gradually changing towards hard disk drive on-line systems

2007 storage costs (of systems >100TB) 7-9 €/GB/year

Today < 1€/GB/year

Price reduction flattening out

Subsequent digital content migration has become an undisputed principle for audio and video archiving

More recently, even film archivists joined in after some reluctance, even opposition

1996/97: birth of TC 03

Closely related to increasing role of IT specialists and their recommendation to produce data reduced archival files (MP3)

IASA-TC members had to assist colleagues against recommendations from IT people

TC-03 was (and still is) intended to be a quotable reference against unprofessional approaches

Archival principles:

Complete extraction of signal from original carrier

Modern equipment adapted to historical format parameters reduces replay distortions almost to zero

For damaged mechanical carriers improvement possible by optical replay

Not yet routine: extraction of

- bias signal from magnetic tape to correct w&f
- some sub-code information from digital audio originals (R-DAT)

Transfer technology may improve – keep original as long as possible

Unmodified transfer of contents

Aesthetic insufficiencies and damages are part of the document: No “improvement”, filtering, de-clicking, de-noising, etc., on digital archival masters, *“Archives have to preserve, not to re-write history”* (Bill Storm)

However: some corrections can only be made in the replay of the original, e.g. minimising print-through, correction for misaligned recording heads, mostly azimuth error

Archival principles cont'd

No proprietary digital target formats

.wav (BWF) international de-facto standard

Minimum resolution for analogue originals (IASA): 48kHz, 24 bit

De-facto standard for memory institutions: 96kHz, 24 bit

Noisy historical recordings: 192kHz, 24 bit

Digital originals: keep sampling rate and bit depth

No data reduction (“compression”) for analogue and linear digital originals

Compressed originals: keep encodings unmodified (if possible)

Lossless compression permissible

Archival principles cont'd

Check data integrity in regular intervals

Refresh data if needed

Migrate data to new storage systems before the old one becomes obsolete

Preservation metadata

- format and state of preservation of original carrier,
- all equipment and parameters used for replay and digitisation
- digital format and resolution
- checksum
- operator

Implicit principle of TC 03

The “essence” of the document, the object of digital preservation, is the **signal found on the carrier**, retrieved with the least possible alterations through playback distortions

2016/17: Revision of TC 03

Version 4 extended to cover “audiovisual” documents

Principles for video & film should closely follow audio,
but :

- video far more locked to original equipment than audio - limited potential for reducing replay distortions by modern equipment
- present routines for SD (ITU 601) reduce colour representation of composite signals
- insufficient/missing routines to safeguard sub codes
- specific list of corrections to be made during signal extraction from originals only (e.g. drop out compensation, wet gate scratch removal)

Extending TC 03 to video and film brings video art and historical art films in the scene and historical reproduction back into discussion

[Bill Storm's Types of Re-Recording of 1979 (Type I Audio History, Type II Sound of the Artist) have not been further pursued]

Objects of art *may* need historical reproduction, if features (limitations) of contemporary reproduction were influential part of the creation

Modern reproduction could possibly introduce alterations, which the artist, at the time of creation, has never seen

But: Historical reproduction will generally need a series of (fairly) subjective decisions...

...consequently: parallel to historical reproduction, standard signal extraction shall be made

Differences of historical reproduction vs modern standard signal extraction:

- high for film and audio
- lower for video

Many (most?) early video art objects would probably be faithfully reproduced by standard signal extraction combined with display on historical CRTs

Creation of new video art objects:

- follow professional production standards
- use well calibrated professional equipment

TC 03 conclusion

Extension of IASA-TC 03 to video and film does not disrupt the principles developed for audio documents

However, for historical art objects a window must be opened for historical reproduction

References

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Thank you !

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