PAVING THE WAY TO FUTURE TV ARCHIVES
Content digital migration at INA - near term solutions

by

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I - Assets caracteristics and needs for the mid term :

Audiovisual assets managed by INA are approximately :

- Television archives : 500.000 hours including 40% film base, 60% video tapes

- Radio archives : 600.000 hours including more than 90% onto 6,25 audio tapes.

The mid term contents transfer program to digital formats for preservation and communication, is based on two main criteria :

- Endangered material due to obsolecence , physical and chemical degradation of analog media,with special attention to single material.

- Repurposing.potential

for television archives expected plan is to transfer 220.000 hours in less than 10 years from the following legacy formats.

Nature	Volume (hours)	Expected costs (french Kfrancs)
- **2 inches video tapes** (theatre, drama, entertainment, talk show, magazines, live show) 1960 à 1980	22 000	22 000
- **1 inch B video tapes** (magazines, documentaries, entertainment, talk show , live show) 1976 à 1988	12 000	8 000
- **Umatic ¾ inch video cassettes** (news , talk show, games) 1976 à 1990	130 000	78 000
- **Film : single reversal original** (news , magazines, a few documentaries and drama)	8 000	48000

-	**Film : copies** (drama, documentaries)	48000	144000
	Film : kinescopes (news , talk show , entertainment, live show , …)		
	TOTAL	**220 000**	**300 000**

II - Digital formats and procedures for digitization and preservation : functionality, quality and economical criteria of choice.

II-1. functionality and quality criteria for short term choice.

II-.1.1. Digital asset acessible for professionals : producers and broadcasters.

* for old programmes rebroadcasting.

- With additional digital processing for pictures and sound restoration before communication.
- Possibly with rights examination.

In this case direct access through automated asset management system and network is not requisite. Hight quality digital video formats still fit the needs.
If compressed format is chosen, this should be in a quality high enough to be compatible with added digital processing used for picture restoration.
Only low compressed ratio are acceptable : Digi Beta , DVC Pro , MPEG 422.

Main contents concerned for such applications are :

Drama and series - documentaries - magazines.

* For short extracts insertion in new productions based on archives or in current programmes (news, intertainment…).

This application doesn't need high quality level of the pricture restoration. Quick access is important criterium.

This concerns large collections as entertainment, talk show, live show, news, sports, from which short extracts are selected to constitute an image bank.

For these applications content digital encoding must be compatible with the performance and cost of near term available data tape and disc based masse storage systems and computer based plateforms.
Taking into account of the repurposing potential of this kind of programmes relatively high ratio compressed formats can be used for content migration from analog to digital.

MPEG 2 format at CBR 8 Mbits/s is used with satisfying results by INA since 1996 , and should be adopted for the preservation of Umatic records.

II - 1.2. Digital asset accessible for large group of consumers. (educational applications, sociological or historical researches,…).

The aim is to develop automated access system through wide area network.

In this case no added processing is considered for the sound and picture quality improvement.

Compressed format and quality level of compression are chosen as a compromise between the following considerations :
- Viewing quality the nearest possible of today consumer analog format : VHS.
- Today public wide area network capacities (not enough yet)
- Acceptable mass storage and delivery costs.

MPEG 1 at 1 Mbits/s format is the INA today choice for these applications

II - 2. Mid and long term functional criteria :

They take into account the quick obsolescence probability of today's digital formats.

Today migration of analog content to digital is only real time operated and needs important human operation.

Tomorrow, due to the large volume of audiovisual programmes accumulated it will be necessary to transfer digital content into new media with automated procedures and faster than real time.

For this.

Mid term goal is to use compressed format as a result of following considerations :

- Compatibility with hierarchical mass storage systems and operation procedures computer based for systematic preservation checking and non real time transfer onto new media.

- Quality compatible with new expected applications.

- Economical conditions.

Different compression ratio would probably be used depending of the content interest and repurposing potential.

II - 3. Economical criteria :

II - 3.1. Analog to digital transfer costs.

From 2 inches and 1 inch B video tapes :

Low level of possible automation.

Sequential recording with re-assemble may be necessary due to encountered play back failures (head cloging, loss of tracking…).

Despite these problems mass transfer costs with low failure ratio (< 5%) remains relatively cheap.

2 inches : 120 • per hour (media not included).
1 inch B : 75 • per hour (media not included).

From Umatic ¾ inch :

Bad play back conditions are encountered (head cloging, cassettes mechanical failures). However, a high level of automation has to be reached to lower the costs due to the volumes and to the lowest technical quality of the content stored on this format.

The cost should be lower than 60 • per hour.

Film :

Mechanical base and splice repair , and telecine transfer are costly :

From 540 to 1 400 • for one hour.

II - 3.2. Storage media costs :

Video tape digital beta : # 27 • per hour

Data tape (DLT, DTF) : # 80 • for 40 Go capacity

One hour MPEG 2 # 8 •
One hour MPEG 1 # 1 •

Hard disc # 125 • for 1 Go.

One hour MPEG 1 # 125 •.

II - 4. Format and media choice for preservation and communication at INA :

- **For elaborated programmes preservation** (drama, series, documentaries, magazines) and more generally for all programmes archived onto 2 inches, 1 inch and film :

Short term choice (2 to 3 years) remain digital Beta format which is used by INA since 1993.

It should be abandoned in the next 2 or 3 years for a new format, probably data tape based with higher compressed ratio.

- **For "live" programmes preservation** (news, talk show , live show) archived on Umatic ¾ inch format.

Short term choice is MPEG 2 format at constant bit rate = 8 Mbits/s based on data tape (DLT or DTF).

First mass transfer operations should start next october.

- **For professional communication :**

Today copies for communication are recorded onto Betacam SP format simultaneously to the digital Beta.

This choice takes into account the easy operation offered by analog beta SP format and the important set of play back machines in use at INA.

In a few months MPEG format copies will be systematically encoded from digital Beta and stored onto data tape :

- MPEG 2 CBR at 8 Mbits/s for professional communication
- MPEG 1 at 1 Mbit/s for viewing purposes (researchers, scolars…).

Beta SP copies should be abandoned as soon as MPEG 2 files play back units will offer the same easy use.

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