

INTERFACES

Decisions may always be taken by an operator who may, at any moment, decide to change a parameter, an action, at a specific time-code or position, to manually point out a zone to be corrected, or even at times to modify the editing of the programme.

Navigation features

The user interface provides both on-screen VTR control functions, and a jog-shuttle control knob, which makes the operator comfortable with the navigation through the programme. A "clip" view of the programme helps the user to go directly to a specific image, and to mark in-points and out-points for specific operations.

The Disk store is used as a cache for the VTR. This means the operator has instant access to a large part of the programme, and avoids the usual VTR delays. The size of the cache varies from 20 to 90 minutes, which reduces

strain on the tapes and VTRs, and usually provides instant access to the desired position.

Generic access to the parameters

The system offers access to numerous parameters. Any parameter can be modified immediately for interactive tuning. When the user is satisfied with the corrections, he specifies the time-codes at which these settings will be applied.

The same interface allows the modification of the parameters for a slower, but more versatile software process.

The restoration plan

The parameter modifications are recorded. This will permit direct editing of the instructions.

Events such as a scene change or large dirt particle recognition are also recorded, and this allows the user to specify settings or actions related to these events.

SUMMARY

The AURORA project has placed at the disposal of European television channels, programme producers and educators, a service that will enable them to make much more effective use of video and film assets. This should make efficient use of resources for conserving, broadcasting and restoring rare and irreplaceable documents.

The tools help in dramatically reducing the costs involved in restoring television programmes, and give new life to programmes that could not otherwise reach today's quality standards.

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<http://www.ina.fr/Recherche/Aurora/aurora.en.html>



restoration tools

for the future: the **Aurora** project

The AURORA project has created a tool which helps to restore signals from television archives. In this era of new communications channels such as multimedia, video-on-demand, cable and satellite, new outlets are opening up, and these are excellent opportunities to exploit our audio-visual archives.



restoration tools

for the future: the **Aurora** project

RESTORATION: A KEY FACTOR FOR TELEVISION ARCHIVES

The BBC has many archived programmes which make up a unique record of history, of artistic and cultural development and of all aspects of life.

Each type of video and film format has its own characteristic degradations, and problems increase with each replay.

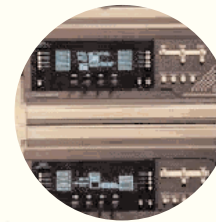
Several videotape recorders are no longer manufactured or serviced by the manufacturers; this situation results in increased maintenance and operating costs. The BBC is therefore copying its collections onto new media, but often the quality of the copy is well below today's standards.

The exploitation of this type of programme depends a great deal on the quality of the

material. Solutions for restoring quality at an acceptable cost are therefore desirable as part of the exploitation of television archives.

AURORA has developed a fast and effective video restoration system with the following characteristics:

- Real-time detection of impairments and estimation of quality level.
- Restoration in real time with control of level of correction by the user.
- Interactive restoration tools for high quality restoration or for badly damaged materials.



The two real-time hardware units.

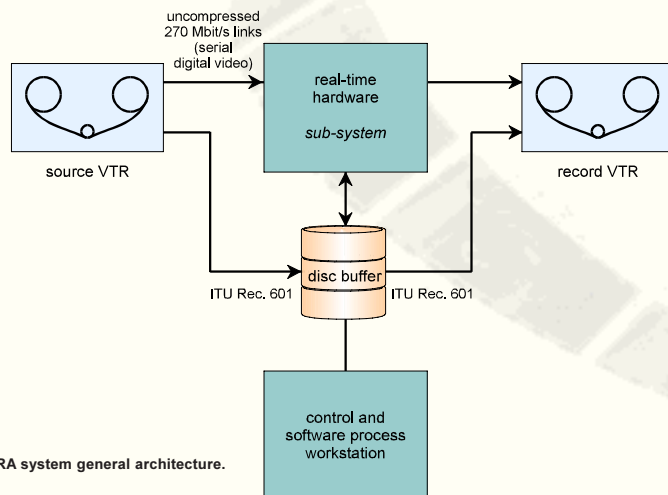
USER SELECTED AREAS

An interface is provided for manually specifying which areas are to be subject to a particular process. One can stop on a specific image, draw a rectangle around an area which is damaged, and can specify which action has to be taken there: for example, dirt correction (default), but also film scratch.



SYSTEM ARCHITECTURE

AURORA uses real-time 4:2:2 digital video. Signals run from tape-to-tape, but the system includes temporary storage of images, complemented by software control and software processing running on a Workstation.



The AURORA system general architecture.

REAL-TIME RESTORATION

The system processes in real time :

- Video noise, film grain and other random continuous defects,
- Impulsive and erratic impairments (video drop-outs, film dirt, sparkle, etc.),
- Unsteadiness,
- Flicker,
- Film scratches,
- Continuous linear defects (streaking, echoes, loss of detail, etc.),
- Colour correction

The real-time hardware is divided in two 6-U units :

- The Unsteadiness & Flicker correction Unit (additionally, this provides for colour correction and luminance-chrominance delay)
- The Noise, Dirt & Grain reduction Unit (this unit includes film scratch concealment, linear/spatial/median/motion-compensated recursive noise reduction, linear processing, and motion-compensated dirt concealment).

The units can be controlled manually, for experimenting, via their front panel, or via the user interface, with frame-accurate control.



Drawing by hand areas with a different processing.