

ARRI



Alfred Hitchcock in Blackmail (1929), Courtesy of Canal + Image UK Ltd.

ARCHIVE TECHNOLOGIES

Solutions for Motion Picture Archives



COMPREHENSIVE TOOLS AND ACCESSORIES

Over the last few years the ARRISCAN and ARRILASER have set industry standards for digital postproduction. In cooperation with film archives and restoration specialists worldwide, ARRI has now expanded its range of cutting-edge technologies for digitizing and remastering historical films.

Offering the most versatile, upgradable and high quality toolset for restoration facilities and film archives on the market today, the ARRISCAN and its various archive accessories are increasingly relied upon for the most prestigious international restoration projects.





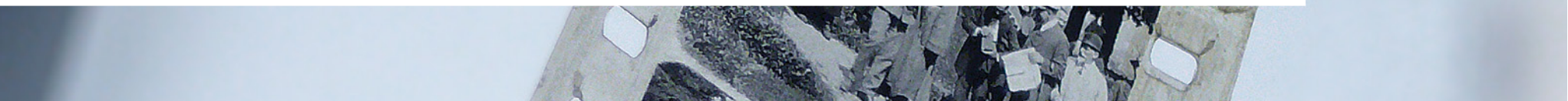
Wet Gate



Sprocketless Transport System



Sprocket Transport System





THE CHALLENGE

THAT LIES AHEAD

A RACE AGAINST TIME

All around the world, film archives have to deal with the immense amount of film material that has accumulated over the last century, most of which has yet to be digitized to an acceptable standard.

The early years of cinema saw a profusion of short-lived film formats, which complicates matters; worse still is the fact that overuse and poor storage conditions have led to damage of many different types, from torn or missing perforations to scratches, warping and shrinkage of film materials.

Nitrate film, which ceased to be used in 1951, requires the most urgent attention, as this material deteriorates constantly and is highly flammable. In many instances, the struggle to preserve what remains of our collective cinematic heritage is a race against time.



Image: L'immagine Ritrovata - Courtesy of Fondazione Cineteca di Bologna



Image: © AFL / Coll. Institut Lumière



Image: La Cinémathèque française



Image: La Cinémathèque française

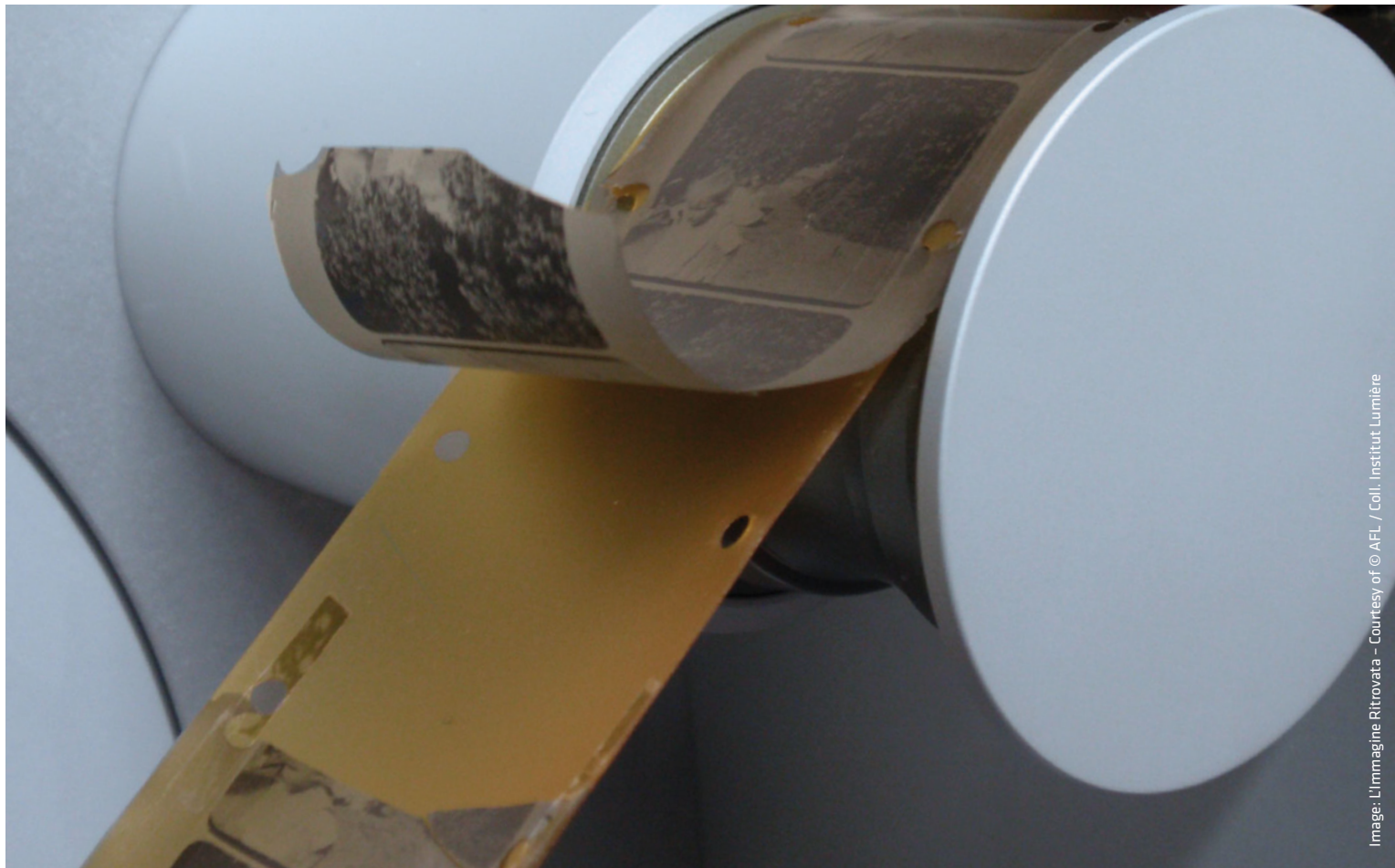
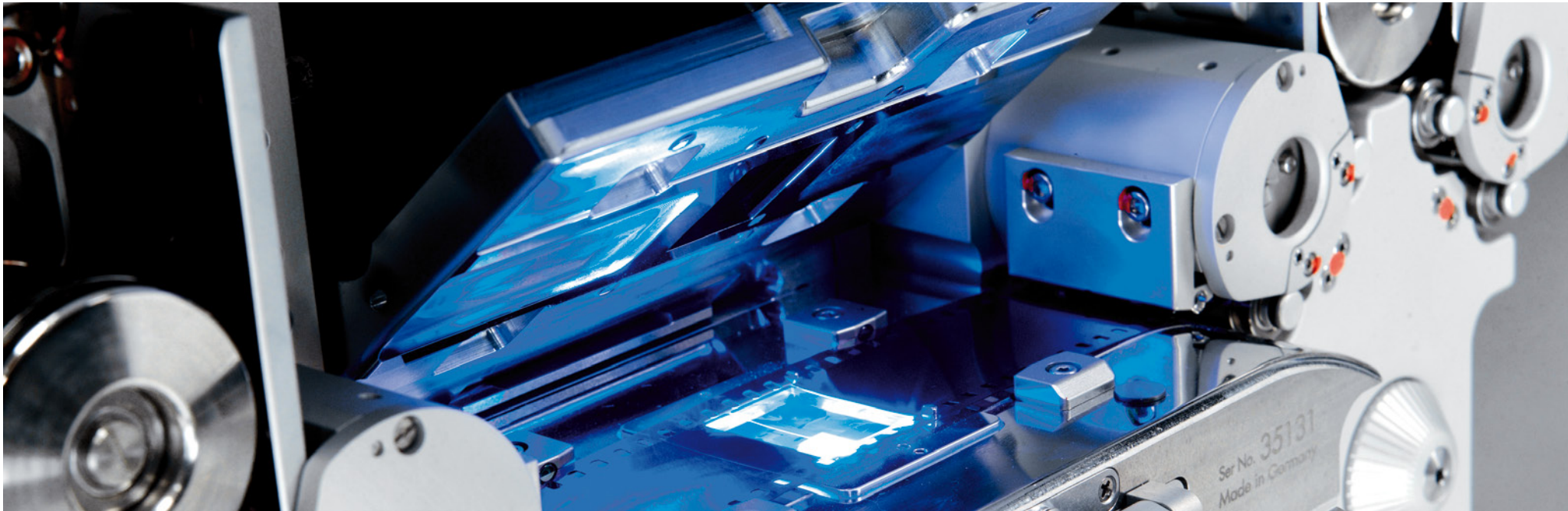


Image: L'immagine Ritrovata - Courtesy of © AFL / Coll. Institut Lumière



SCALABLE

SOLUTIONS



WHY ARRISCAN?

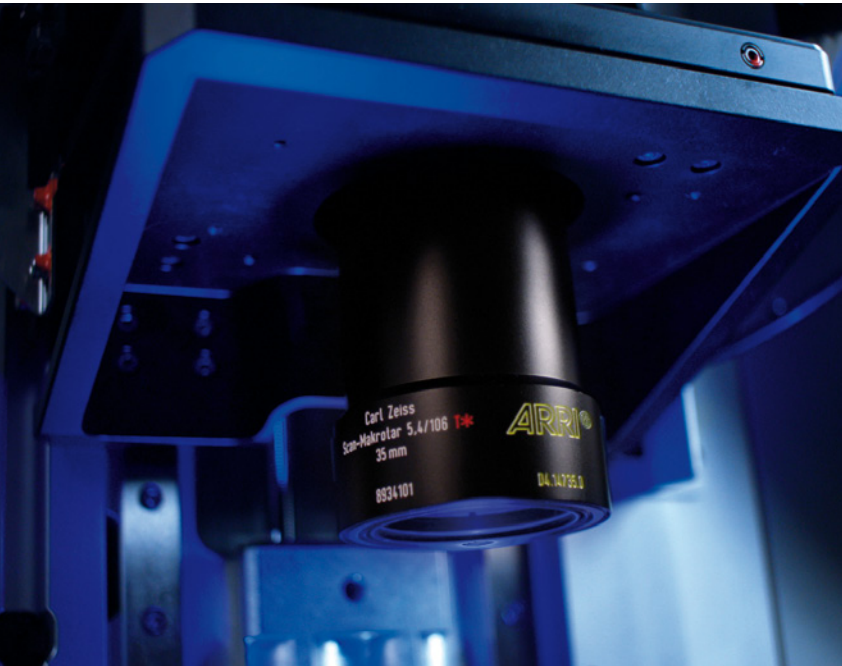


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Configuration of the ARRISCAN is completely scalable to meet the needs of different jobs, archive materials and delivery formats. Starting from the entry-level ARRISCAN 2K, every machine – no matter if new or already in use – can be upgraded to suit any task.

The diffuse, high-power LED illumination of the ARRISCAN reduces the visibility of scratches and does not produce any heat at all – a prerequisite for nitrate film scanning. It also offers the most precise calibration, as well as color and brightness stability.

Developed by ZEISS in cooperation with ARRI, the ARRISCAN optics – with variable optical magnification – make sharpness-reducing digital resizing of scans unnecessary, even when scanning unusual frame dimensions or shrunken film material.





PRESERVATION OF IRREPLACEABLE ASSETS

A DIGITAL REPLICA

For any film archive, the primary focus must be on preservation. The ARRISCAN's role in this task is to capture precious film materials in as close to their original condition as possible, while avoiding further damage.

The ARRI Wet Gate helps get the best image from degraded materials by using a special liquid to conceal scratches on the base side of the film. If required, Kodak Digital ICE Technology can also be used in the same pass for infra-red based image reconstruction, correcting defects on the emulsion side.

With these and other specialized tools such as the ARRI Sprocketless Transport and built-in stabilization, the ARRISCAN enables motion picture archives to safely create a precise digital replica of their holdings.



Original scan



Scanned with Digital ICE



Scanned with ARRI Wet Gate + Digital ICE in one pass

“THE KEYWORD BEHIND OUR DECISION TO GO WITH ARRI IS PRESERVATION; WE’RE A PRESERVATION OPERATION AND OUR FUNDAMENTAL CONCERN WHEN DEALING WITH OUR COLLECTIONS IS THAT WE CARE FOR THEM PROPERLY.”

CHARLES FAIRALL, HEAD OF CONSERVATION, BRITISH FILM INSTITUTE

MAXIMUM
DETAIL

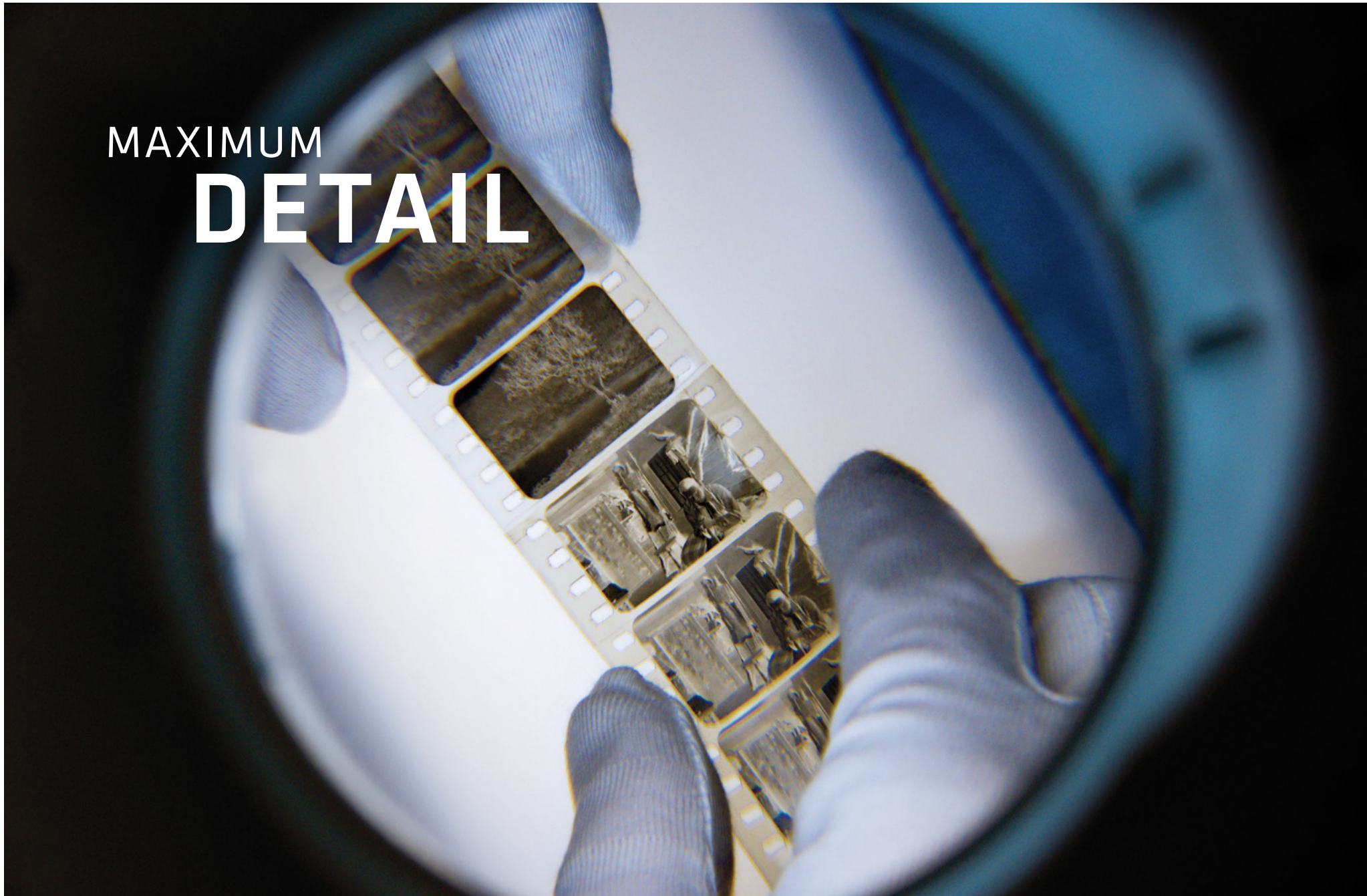
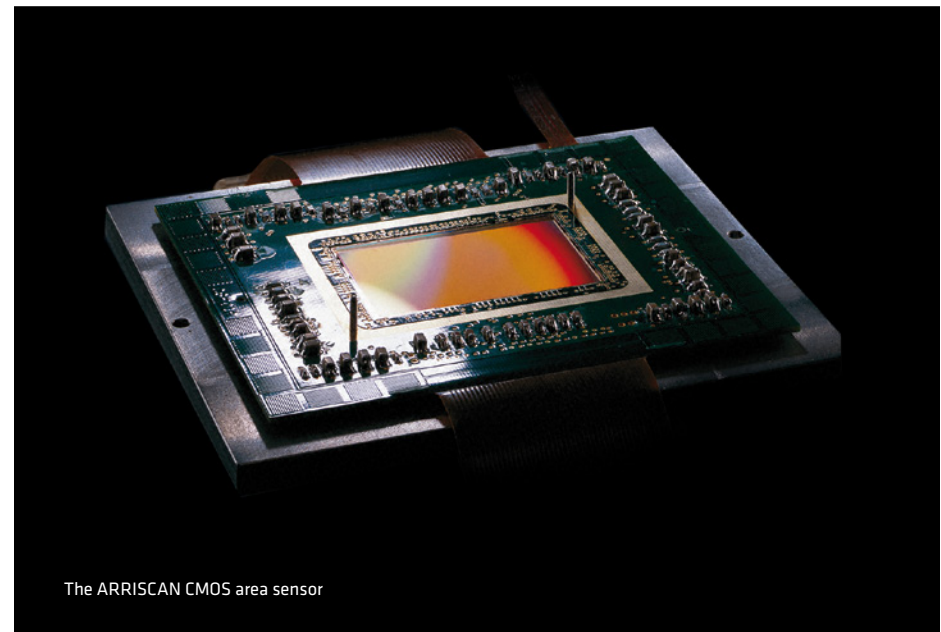




Image: National Library of Norway

When scanning historical film, it is crucial to capture as much detail as possible – it might be the last time the material will ever be touched. Offering resolutions from PAL up to 6K, the ARRI-designed CMOS area sensor captures the maximum amount of detail and - unlike telecine machines or line sensor scanners - produces distortion-free scans regardless of the film's condition.

With a wide variety of negative, reversal and print material to be scanned, dynamic range is another key factor to image quality. ARRI's unique double exposure method exposes each frame of film twice, at different light levels. Both of these images are digitized and composited into a single output image of exceptional quality.



The ARRISCAN CMOS area sensor



Images courtesy of Beta Film



RESTORATION TO FORMER GLORY

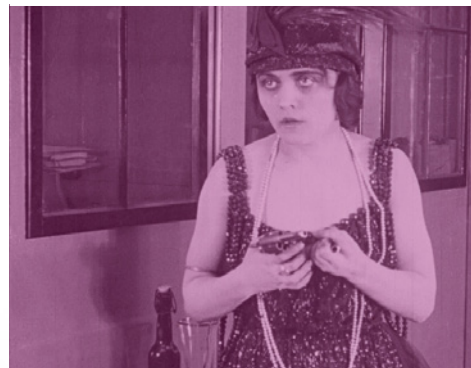


Images courtesy of Filmotheka Narodowa

Digital technology has not only paved the way for filmmakers to create inspiring new works of art, but also provided the opportunity to reach back and restore classic movies and TV shows to their original grandeur.

The restoration process allows historic and sometimes neglected film materials to be introduced to modern audiences, and also preserves the original filmmakers' vision for future generations.

Today's digital tools allow for the manipulation of grain, color, sharpness and image stability, and can even be used to recreate missing or heavily damaged frames. The degree to which it is deemed acceptable to use such tools is an ongoing debate, and must be decided on a case-by-case basis.



REMASTERING

FOR A NEW AUDIENCE



Images courtesy of ITV Studios Global Entertainment

“THE ARRISCAN’S PARTICULAR STRENGTH, FOR OUR NEEDS, WAS THE WAY IT HANDLED THE REGISTRATION OF THE JOINS, BECAUSE IT DEALT WITH THEM UNIFORMLY.”

MATT BOWMAN, COMMERCIAL DIRECTOR, JCA, UK

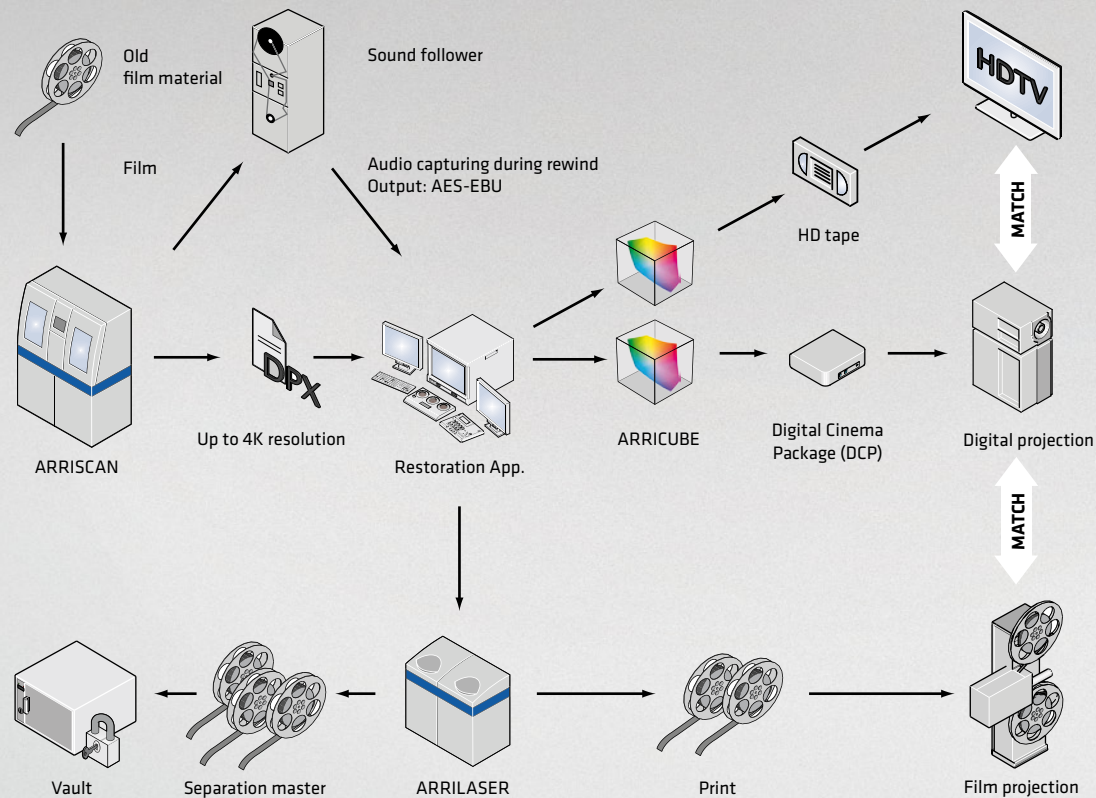
Whether a classic movie or TV show is being remastered for theatrical exhibition or Blu-ray DVD release, the best possible starting point is for original film materials to be scanned on the award-winning ARRISCAN. This can be done at a resolution of 6K (for 4K) or 3K (for 2K), using appropriate ARRI archive hardware, after which digital restoration software is typically used to remove dust, fix damaged frames and improve color.

With DVD extras such as behind-the-scenes documentaries and interviews tempting consumers, the remastering market has become huge. The ARRISCAN gets the very best from even severely damaged film materials and will deliver unsurpassed image quality at the very beginning of the remastering process.



WORKFLOW

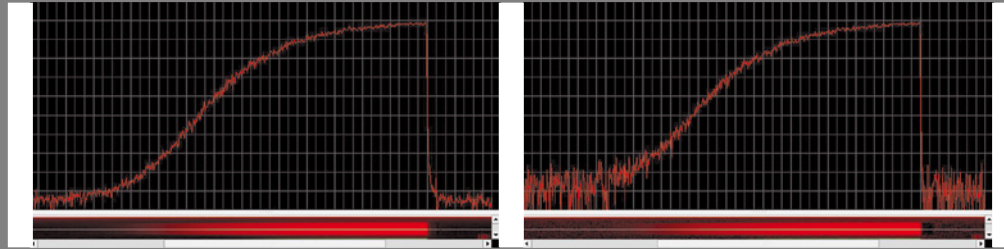
EFFICIENCY



Effective digitization pipelines are crucial for winning the race to save precious film materials. Careful preparation and setup are especially important for archive work because the physical properties of historical film tend to change unpredictably, so utilizing normal postproduction schedules can prove difficult.

LUTs for black-and-white scanning, custom dynamic range settings and special light calibrations for positive films can be loaded into any ARRISCAN, keeping time-consuming scan adjustments to a minimum.

ARRI Archive Technologies Workflow



Double Exposure

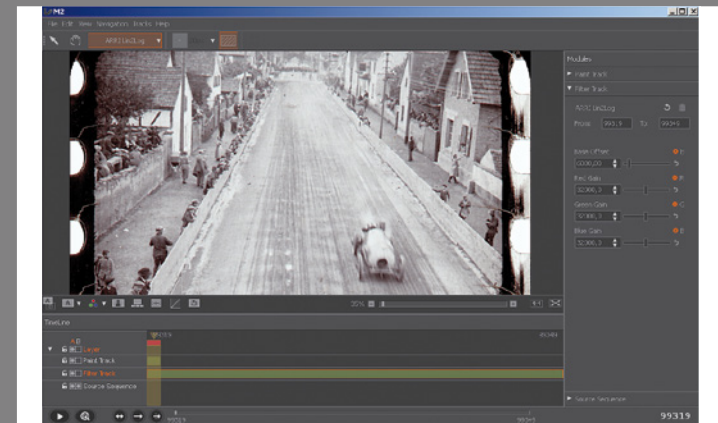
Single Exposure

ARRI's unique double exposure method exposes each frame of film twice, at different light levels. These graphs compare signal-to-noise ratios on a print color wedge with densities of 4 (left) to 0 (right). Significantly less noise is visible in the high densities when using double exposure.

ARRISCAN RAW

The ARRISCAN, with its double exposure method, can scan film material in 16-bit raw data without any compromise. In cooperation with manufacturers of restoration software, ARRI has developed tools to convert this data offline into industry-standard log file formats.

Performing initial restoration tasks on the raw data before downsampling to the output resolution has great benefits for image quality. Downsample plugins designed especially for the ARRISCAN are in development for integration into restoration workflows, to ensure the highest quality possible, now and in the future.



ARRISCAN RAW Plugin for Diamant Restoration Software by HS Art



DELICATE

FILM TRANSPORT

SOFT ARCHIVE MODE

Every ARRISCAN comes with a soft archive mode, allowing adjustment of the film transport to the source material. Together with the specially designed sprockets of the ARRISCAN, this permits even shrunken or degraded material to be scanned without additional specialized hardware.

With the soft archive module, material with up to 3.5 % shrinkage and up to six consecutive missing perforations can be scanned. This minimizes manual repair work, resulting in faster turnaround times, reduced costs and less exposure of fragile film to mechanical stress.

FEATURES:

- Pinless scanning of shrunken film with all ARRISCAN gates
- Easy framing adjustment for non-standard frame positions
- Frameline correction during the scanning process
- Variable winding speed and step transport speed
- Electronically controlled reduction of film tension for brittle material

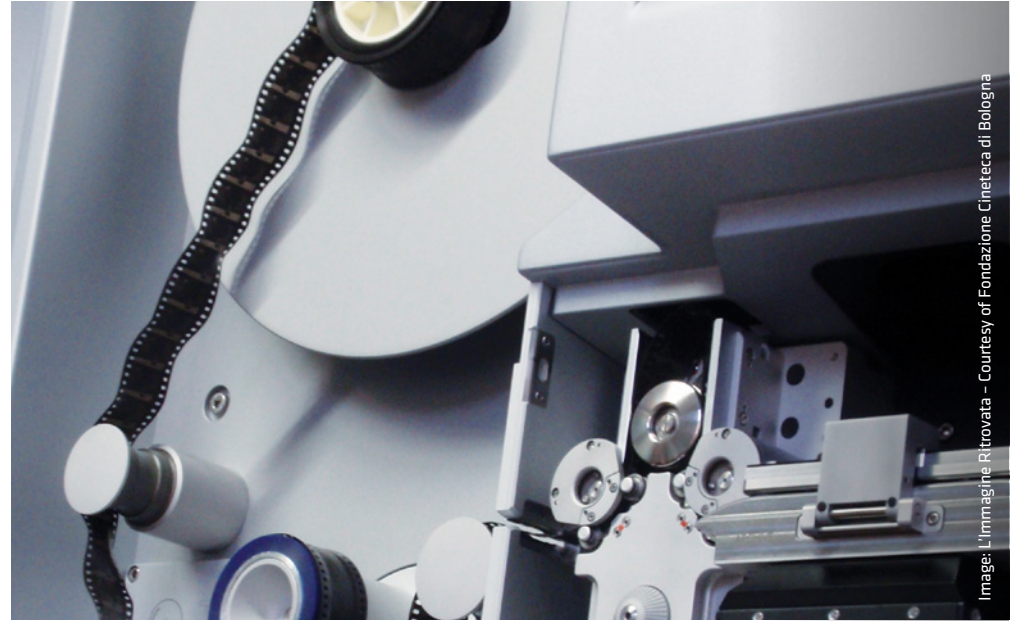


Image: Immagine Ritrovata - Courtesy of Fondazione Cineteca di Bologna

“THE ARRISCAN’S ARCHIVE TRANSPORT MODE ALLOWS THE MOVEMENT AND TENSION TO BE TAILORED FOR A VARIETY OF DISTRESSED SOURCE MATERIALS, PRODUCING DIGITAL SCANS OF THE HIGHEST QUALITY WITHOUT COMPROMISING THE INTEGRITY OF THE FILM ITSELF.”

JOHN PALMER, HEAD OF DIGITAL FILM SERVICES, MOLINARE, UK

ARCHIVE GATES

FOR HISTORIC FILM

Damaged material and unusual frame heights are common challenges for archive scanning. With an aperture that is not only wider, but also taller than standard 16 mm or 35 mm film frames, the archive gates have enough headroom to allow frames to be stabilized after scanning. Severely damaged film can be scanned with ease, as can non-standard film formats with unusually tall frame sizes.

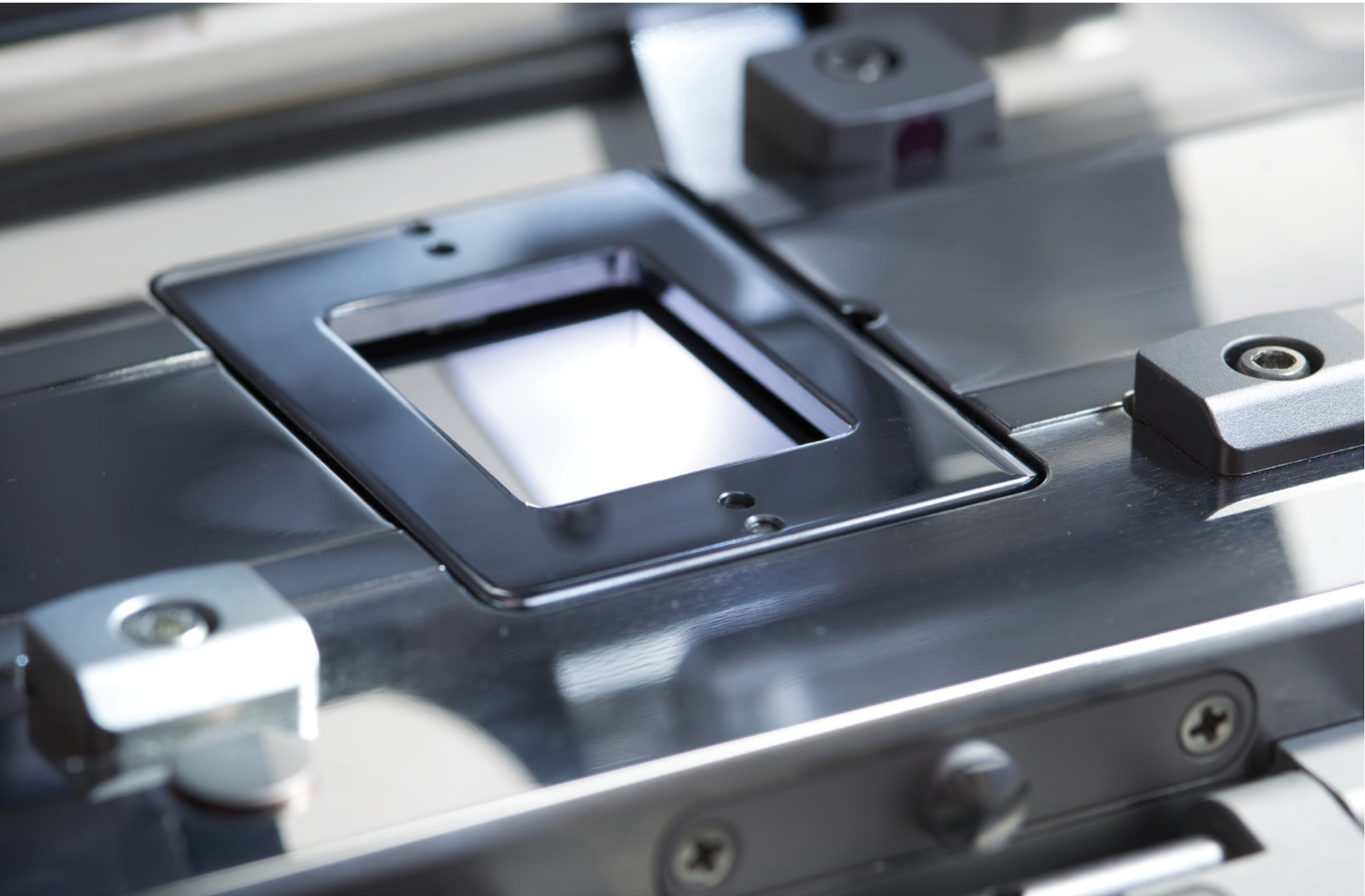
16 MM ARCHIVE GATE FEATURES:

- Pin-registered 16 mm Archive Gate
- 0.55 mm maximum film thickness
- Enables image stabilization on-the-fly
- 14.2 mm x 9.1 mm oversized aperture

35 MM ARCHIVE GATE FEATURES:

- Pinless 35 mm Archive Gate
- 0.55 mm maximum film thickness
- Enables image stabilization on-the-fly
- 28 mm x 21.5 mm oversized aperture





16 MM AND 35 MM WET GATES

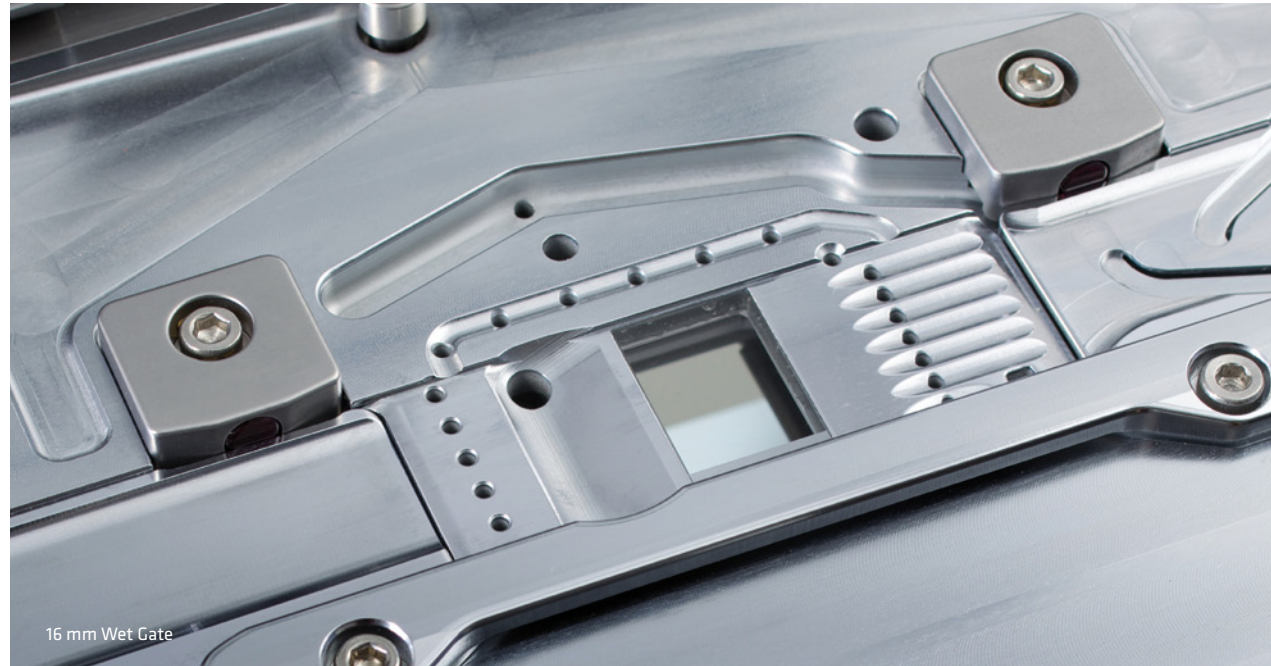


16 MM WET GATE FEATURES:

- Pin-registered 16 mm Wet Gate
- 0.4 mm maximum film thickness
- 2 fps – 3 fps scanning speed, depending on liquid and film condition
- 13.2 mm x 10 mm oversized aperture

35 MM WET GATE FEATURES:

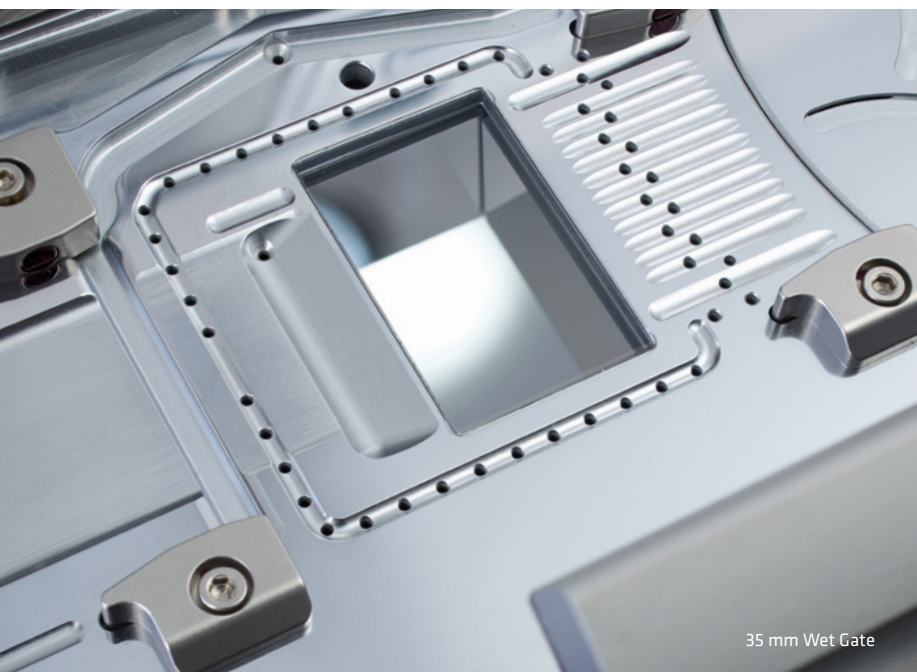
- Pinless 35 mm Wet Gate
- 0.4 mm maximum film thickness
- 1 fps – 2 fps scanning speed depending on liquid and film condition
- 34.5 mm x 21.9 mm oversized aperture



THE ORGANIC APPROACH

Although digital restoration is becoming increasingly prominent in the archive world, heavily scratched film still presents big obstacles and can be expensive to repair digitally. By using a special liquid to conceal dust and scratches, the ARRISCAN Wet Gate system offers a solution that is more organic than digital retouching and far more honest to the original material. It signals the first time such an essential tool has been available on a high resolution film scanner.

Any ARRISCAN can be retrofitted with the Wet Gate system. After initial installation, the machine can be switched from normal to Wet Gate scanning as easily as a changeover from 35 mm to 16 mm.



35 mm Wet Gate

“IF WE GET A REALLY BAD SECTION THEN WE’LL PUT IT THROUGH THE WET GATE. OFTEN THE WORST SHOTS ARE AT THE BEGINNING AND END OF EACH REEL, BECAUSE THEY’VE BEEN HANDLED THE MOST.”

BEN THOMPSON, IMAGE QUALITY SECTION LEADER, BFI NATIONAL ARCHIVE

SPROCKETLESS

TRANSPORT SYSTEM



In every archive, there are hopeless cases – unusual, early, non-standard film formats and material with no remaining perforations. In order to handle even these extreme cases, ARRI has developed a completely sprocketless transport.

This modular system can be installed on any ARRISCAN and for the first time allows severely damaged material to be digitized in perfect quality. As opposed to the capstan transport of telecine-style scanners, the framing can be adjusted electronically, without the need of any sprocket or optical perf detector.

“WE HAVE SCANNED SEVERELY DAMAGED FILMS WITH THE ARRISCAN SPROCKETLESS TRANSPORT. IN MY OPINION NO OTHER SCANNER ON THE MARKET WOULD BE ABLE TO DEAL WITH SUCH CRITICALLY DELICATE MATERIAL.”

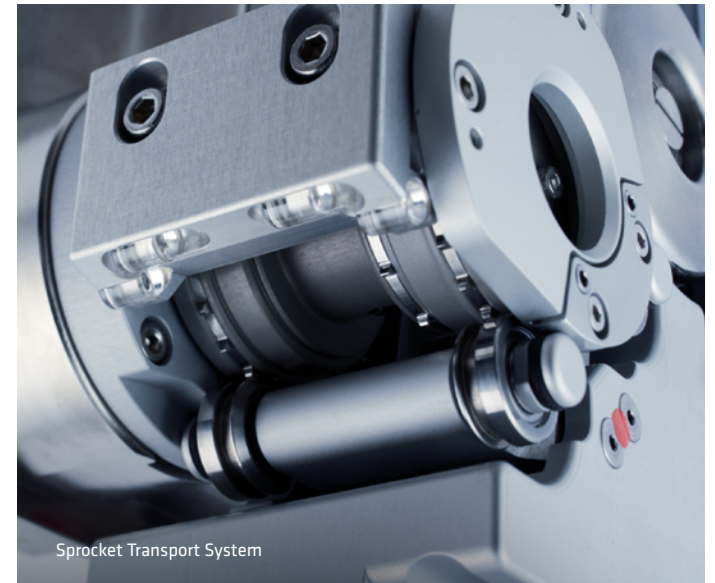
DAVIDE POZZI, DIRECTOR OF L'IMMAGINE RITROVATA, ITALY

FEATURES:

- Variable step sizes
- Support for non-standard perforations
- Easily exchangeable rollers

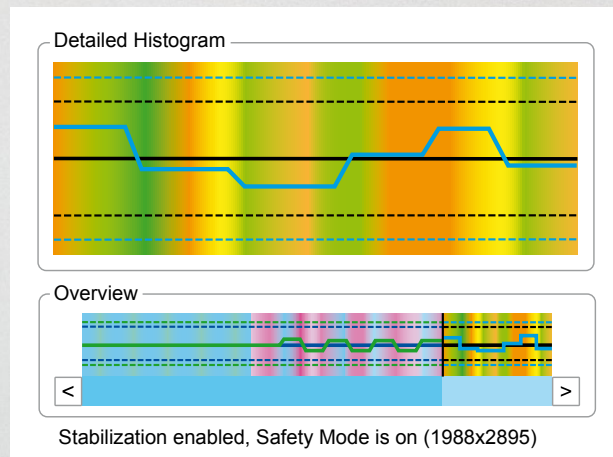


Sprocketless Transport System



Sprocket Transport System

BUILT-IN STABILIZATION

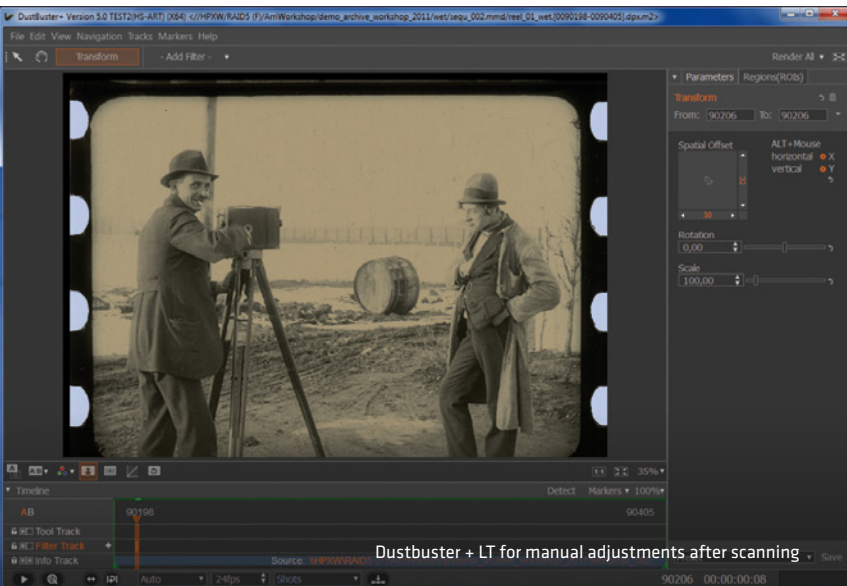
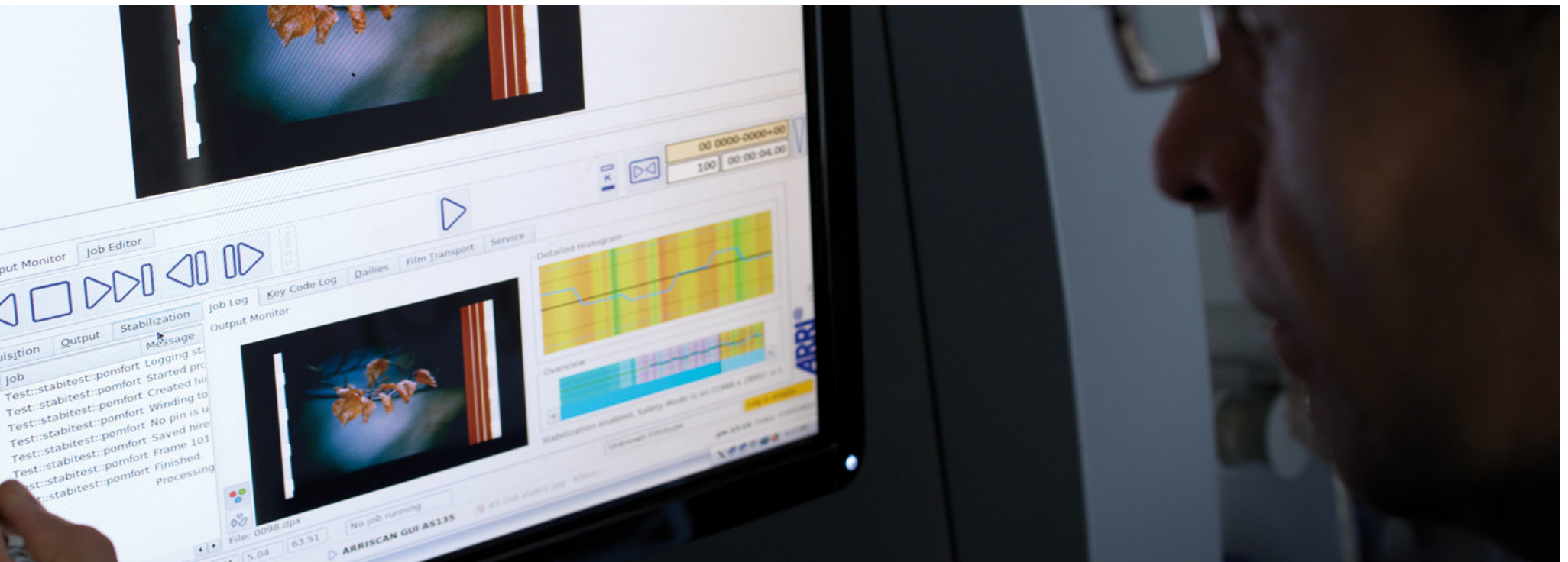


ON-THE-FLY

When scanning film material that is in a delicate condition (shrunken, brittle or damaged), the ARRISCAN registration pin can be retracted. Mechanical pin registration, however, delivers the steadiest possible image, so a pinless scan usually requires some post-processing to improve image steadiness.

The ARRISCAN now presents an easy-to-use solution: an algorithm for on-the-fly stabilization that is implemented in the image processing pipeline. This built-in stabilization has been developed in close co-operation with the R&D team at HS-Art, famous for its DIAMANT-Film Restoration software.

Stabilization histogram
for visual control



Dustbuster + LT for manual adjustments after scanning

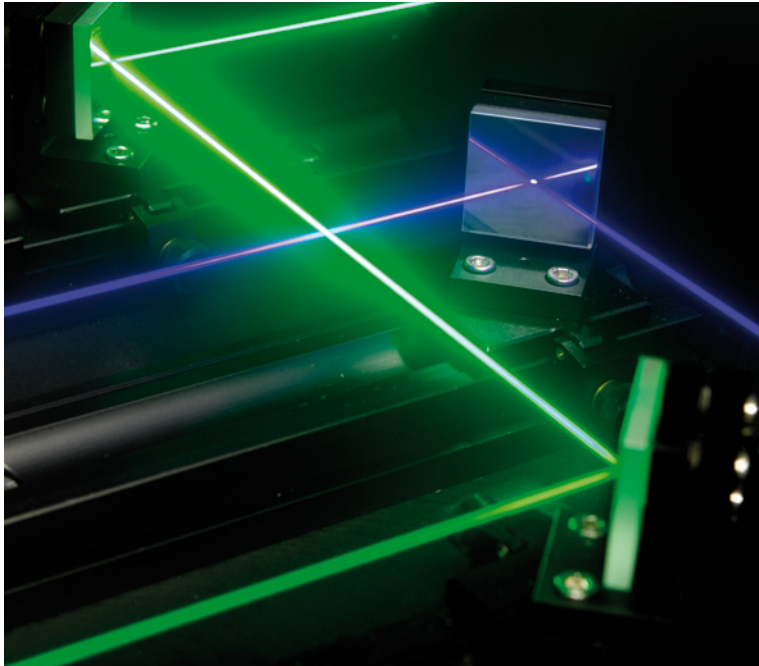
FEATURES:

- Stabilization based on perforation position
- Part of the internal image processing, so scan output is already stabilized
- No loss of image quality in downsampling 3K / 6K files
- Perforation can be cropped before saving the image, reducing the amount of data
- Safety border added to the picture prevents cropping of unwanted shifts
- Stabilization histogram to visually control the correction process
- Free version of Dustbuster+ LT for QC and manual correction of images that were not automatically stabilized



ARCHIVE

FOR THE LONG TERM



ARRILASER



The ARRILASER bridges the worlds of digital film restoration, analog film projection and long-term archiving. Capable of making recordings with resolutions from PAL up to 6K, the ARRILASER can film-out onto intermediate, camera negative and black-and-white film stocks.

With its capacity to record images onto special separation film stocks, the ARRILASER enables 'separation mastering' to preserve feature film and TV production content for future generations, even if it has been shot digitally. Film remains the most proven long-term image storage solution, with modern film stocks capable of surviving 500 years under the right conditions.
















“THE IDEA IS TO HAVE A COMPLETE CHAIN WITH THE ARRISCAN AND ARRILASER, IN ORDER TO NOT ONLY RESTORE OUR COLLECTION, BUT ALSO TO PRESERVE IT FOR A LONG TIME TO COME.”

PAWEŁ SMIEŃKA, HEAD OF FILM RESTORATIONS,
POLISH NATIONAL FILM ARCHIVE



REFERENCE INSTALLATIONS

Many ARRISCAN and ARRILASER systems are located in postproduction facilities and laboratories worldwide that carry out archive and restoration projects in parallel with DI, commercials or TV work, but ARRI archive technologies have also been installed at several film collections, national archives and specialized restoration houses.

				
				
				
Cinemateca Brasileira, Sao Paulo		Cineteca Nacional, Mexico		
National Film Board of Canada, Montreal		Universal Pictures, Los Angeles		

REFERENCE PROJECTS

Here is a small selection of the many classic film and television productions that have utilized the ARRISCAN and its archive accessories as part of a restoration workflow.



Image courtesy of Bavaria Media GmbH

BERLIN ALEXANDERPLATZ
A cooperation of Bavaria Media and the Fassbinder Foundation in collaboration with CinePostproduction and ARRI



Image courtesy of STUDIOCANAL Films Ltd.

BLACKMAIL
The British Film Institute, together with Deluxe 142, has restored nine of Alfred Hitchcock's earliest films



Image courtesy of Constantin Film Verleih GmbH

THE NAME OF THE ROSE
CinePostproduction entrusted with the digital restoration by Constantin Film

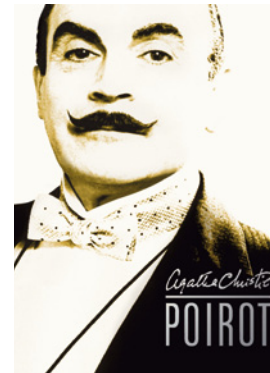


Image courtesy of ITV Studios Global Entertainment

POIROT
HD restoration of series 1-6 of POIROT completed by JCA for broadcast on ITV3 HD



Image courtesy of STUDIOCANAL Films Ltd.

THE MANXMAN
The British Film Institute, together with Deluxe 142, has restored nine of Alfred Hitchcock's earliest films

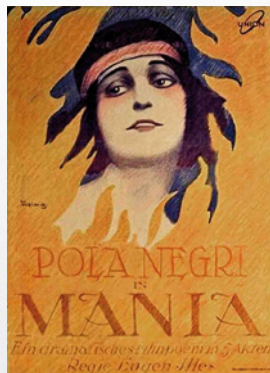


Image courtesy of Muzeum Kinematografii Lodz

MANIA
Project Nitrofilm for the Filmoteka Narodowa (Polish National Film Archive)



Image courtesy of Carlotta Films

LA GRAND ILLUSION
Film restoration for StudioCanal and the Toulouse film institute by L'Imagine Ritrovata



Image courtesy of ITV Studios

THE PLEASURE GARDEN
The British Film Institute, together with Deluxe 142, has restored nine of Alfred Hitchcock's earliest films



Image courtesy of Fassbinder Foundation

WORLD ON A WIRE
ARRI Film & TV on behalf of the Rainer Werner Fassbinder Foundation



Image courtesy of Beta Film GmbH

SISSI
Digital restoration of the Sissi trilogy by ARRI Film & TV for Beta Film GmbH

WORLDWIDE

SALES AND SERVICE

ARRI products are renowned all over the world for their precision and durability. Despite this, ARRI values the trust of its customers in after-sales service and support as highly as their trust in the equipment itself. With service centers covering the entire globe, we are never too far away to provide support at a moment's notice, wherever you might be.

Europe, Middle East, Africa, India

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- ▮ Over 50 service and support partners worldwide; contact details at www.arri.com

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