Quality Control Experiences from the Large-Scale Film Digitisation Project at Bayerischer Rundfunk

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- BR‘s need for film digitisation
- Setting up the digitisation project and workflow
- Getting started, difficulties, need for QC
- The BR image and sound QC system
- QC Findings 2018 - 2020
- Conclusions

The need for film digitisation

- Archiving film started in 1954 at BR
- Water damages, fire and suboptimal storage led part of the archived material into bad conditions:
  vinegar acid syndrome, mold, rust and hydrolysis developed
- With reorganisation of BR rooms and storage space are needed
- Historical valuable and unique material must be preserved
- BR's legacy is to be made available to all departments for research and reuse

Setting up the project „Filmsicherungsprojekt“

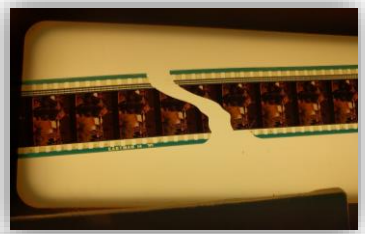
- 50.000 productions to be prepared, scanned and archived within 10 years
  - A litmus paper test set up a priority list
  - Most valuable reels of public interest are also added to the list
- Europe-wide invitation to tender for four lots
- The selection of service providers was supported and accompanied by IRT
- 4 lots are worked on by 2 service providers
  - 80% (16mm, 35mm)
  - 20% (16mm)

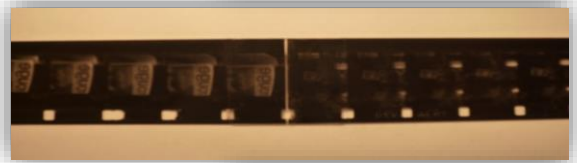
Facts

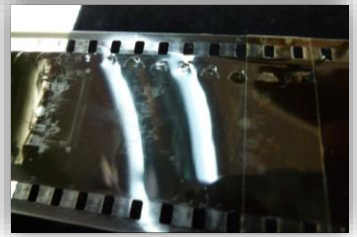
- Avg. production length: 13 min.
- Target throughput per week:
  - 109 productions
  - 1417 min. (apx. 24 hrs)

The digitisation workflow

- Preparation of the reels in Munich by BR
  - Cleaning, physically restoration, few reels are prepared at service provider
  - Film condition is described for easier handling
    (splices, notches, silver plates, color, audio, general condition, duration, etc.)
  - Multiple film rolls (productions) are spliced together to speed up scanning
- Every other week the reels are transported to service providers
  for scanning and mastering
- 3-5 times a week, material returns via Aspera file transfer
  - Preservation master: IMP-Package (J2K and PCM in MXF)
  - Production master: XDCAM-HD
  - Additional data (e.g. report of SP)
- Quality Control
- Digital Archiving

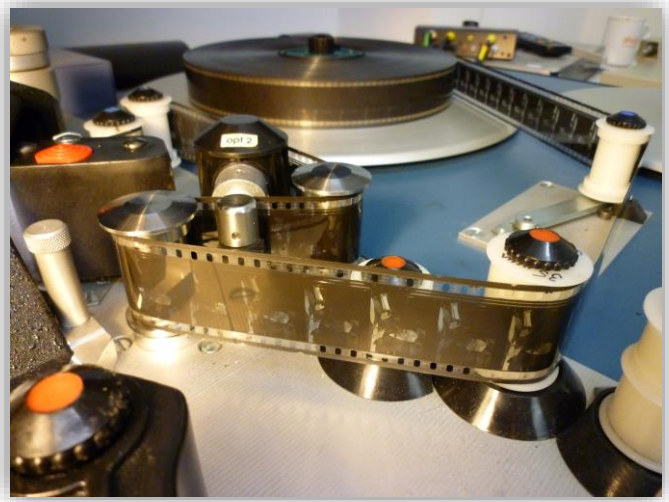






BR manpower of Filmsicherungsprojekt

- Project coordination + planning: 2,5 FTE
- Preparation for cutters: 1,5 FTE
- Logistics: 2 FTE
- Preparation (Cutters): 9 FTE
  - Six 10 hrs shifts a day
  - 6 days a week
- Quality Control+Data MGT: 1,5 FTE (originally not foreseen)
- Technical support: on request



Getting started

- Jan. 2018, the project started ambitiously, but
  - project/workflow management software was not ready
  - material workflow has not been cleared
  - one service provider had to start scanning without wetgate
- QC took place in a different department
  - Spot checking resulted in very little complaints
  - But double checks showed significant issues
- The need for organisation was big

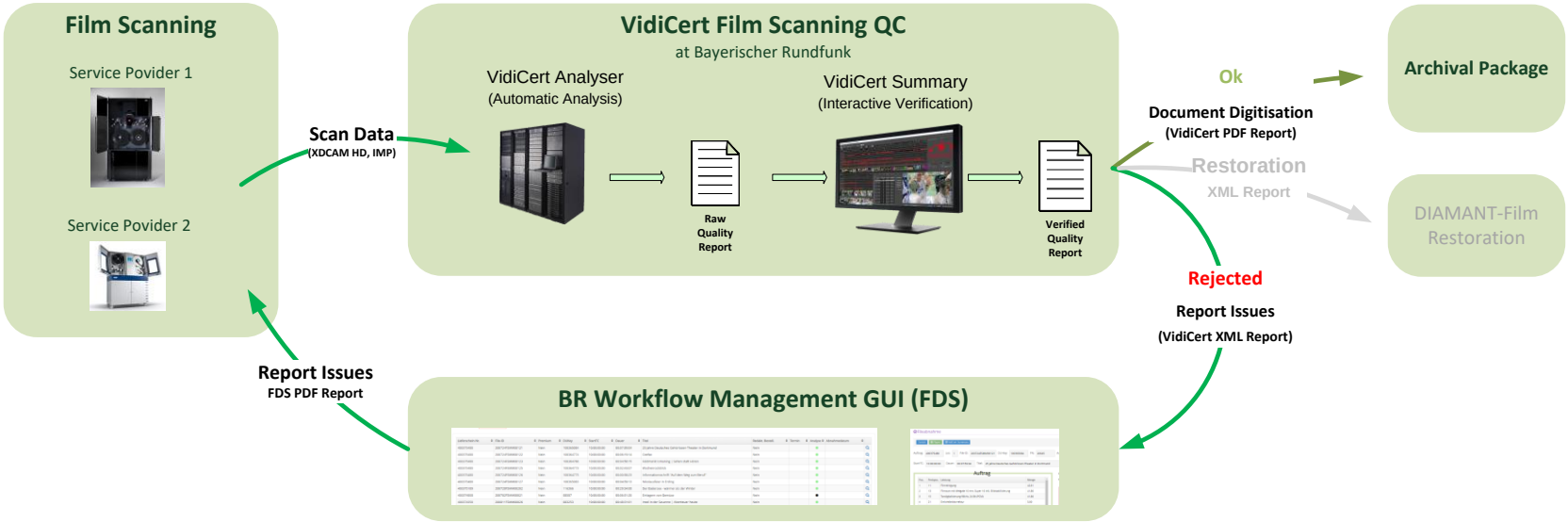
The project gets organised

- April 2018, the management software FDS (Film Digitising System) was implemented to organise WF‘s for all related tasks
- May 2018, one FTE for quality control was added to the project
- Start of QC: viewing all files in full length with mpv-player in h.264 quality
  - Extremly time-consuming and exhausting for employees
  - August 2018, 0.5 FTE was added to QC
- Need for a partial automation and improvement of quality control was big
- Decision for VidiCert quality control solution

The Quality Control Solution @ BR

How does it work?

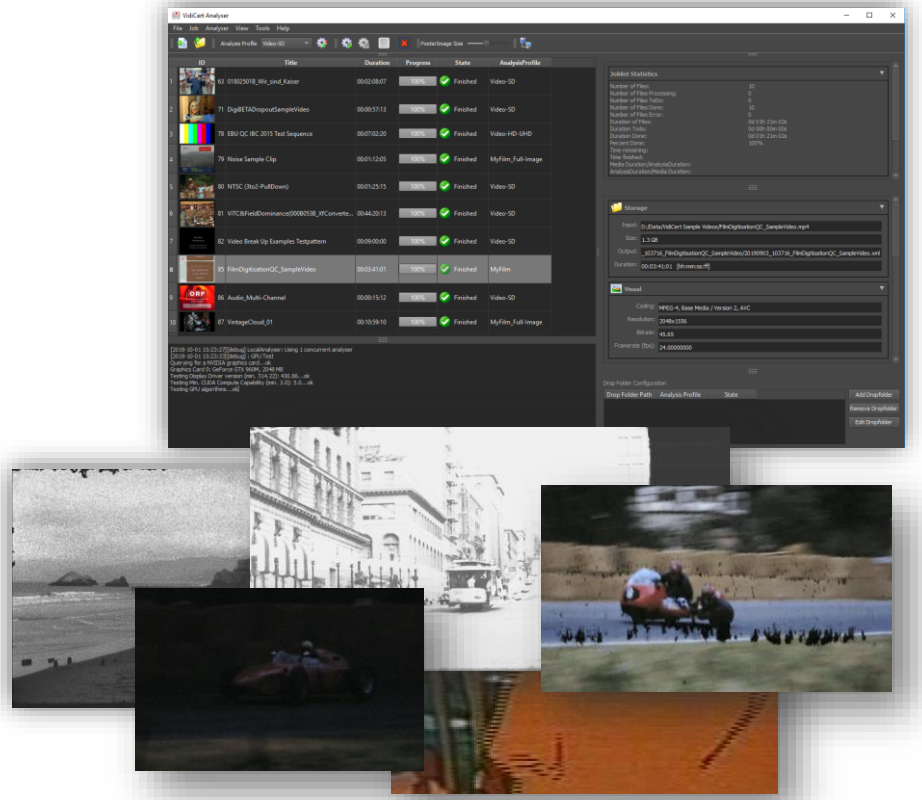
The Image and Sound QC System @ BR
How does it work?



- Scanning Operations
  - 2 service providers, 1 scanner each
  - Creating in average 160 files with 2080 minutes per week including rejected material (Jan.-May 2020)
- VidiCert QC Operations
  - 1 VidiCert Analyser, 1 VidiCert Summary station
  - Current QC throughput: apx. 35 hrs of content in 14 operator hours per week in average

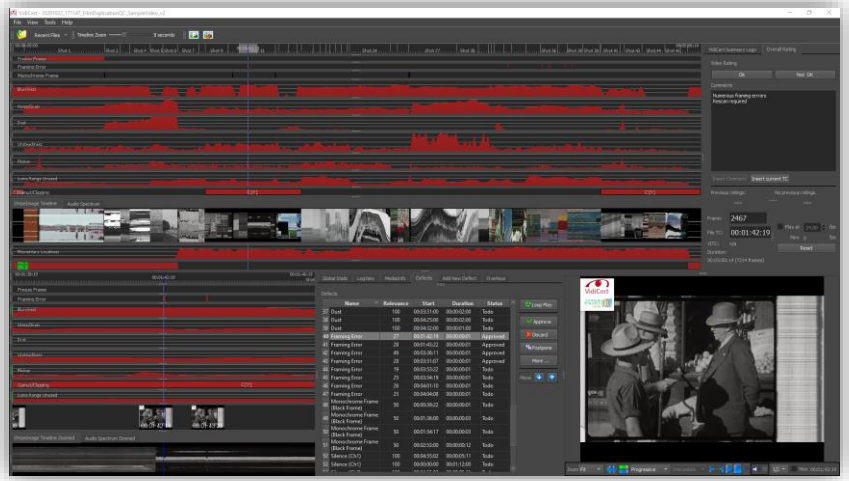
The Image and Sound QC Solution @ BR
Automated Scanning Issue Detection Functions

- Gamut/Clipping (Under&Over Exposure)
- Freeze Frame
- Framing Error
- Dust/Dirt/Hair Level
- Unsteadiness Level
- Film Grain Noise Level
- Out of Focus / Blurriness Level
- Flicker Level, Flash Light
- Contrast/Luminance Range
- Black & Single Coloured Frames
- Black Bar / Aspect Ratio
- Macroblocking
- Audio Silence, Loudness, Superimposed Sound
- Integration of scanner sensor data (optional)
  - Perforation/Shrinkage
  - Splices



The Image and Sound QC Solution @ BR
Interactive Defect Verification

- Time-efficient user interface for
  - Verifying AV digitisation issues detected automatically
  - Annotating AV issues manually
  - Checking content completeness and correctness (image, sound, timecode)
  - Documenting the QC decision
- Creating QC reports
  - Machine readable XML
  - Human readable pdf
- DIAMANT Restoration Report



Peter Schallauer, Joanneum Research

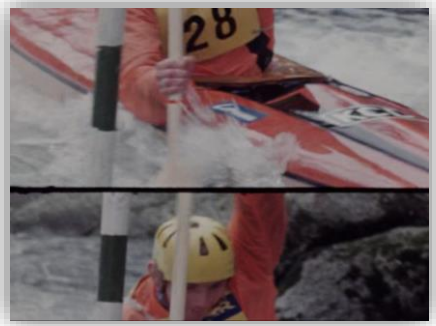
QC Findings 2018 (May-Dec.)

1590 files checked
255 files rejected

- wetgate bubbles
- color issues
- unsteadiness
- framing error
- audio missing
- wrong track assignment
- data package issues

wetgate bubbles

framing and image issues

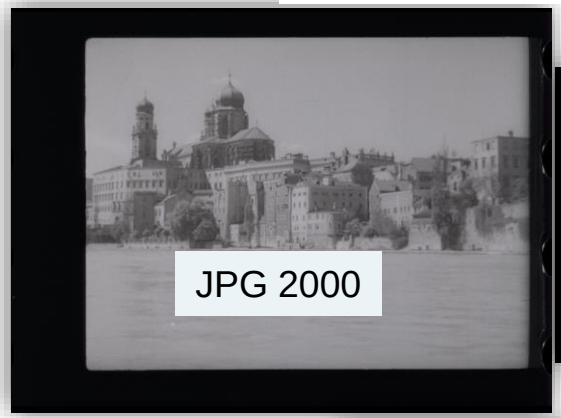


QC Findings 2019 (Jan. – Dec.)

6051 files checked
616 files rejected

- cropping and scaling
- color issues
- unsteadiness
- audio missing
- wrong track assignment
- data package issues
- black frames
- timecode and duration

35mm cropping/scaling



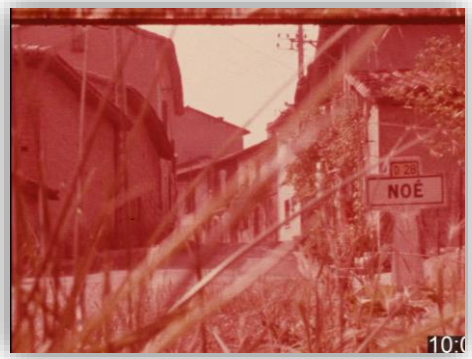
QC Findings 2020 (Jan. – Sept.)

4651 files checked
253 files rejected

- audio missing
- color issues
- unsteadiness
- wrong track assignment
- cropping and scaling
- data package issues
- black frames
- timecode and duration errors

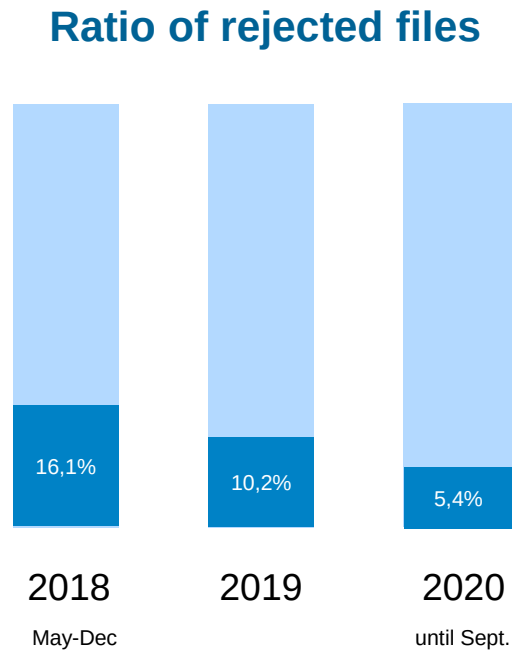
color issue - red rust in b/w

color issue - color cast



QC Findings Overall

- QC detects digisation issues to reject
- QC drives discussion with service provider to solve issues
- Digitisation process improves
- Less rejected files = less overhead for BR and for service providers



Add-on: Document AV Deficiencies for Content to be Archived

- Noticeable AV deficiencies are collected and documented during QC process
  - Unsteadiness, blurriness level
  - Noise, luma range, flicker level
  - Splice bumps, scratches, dirt level
  - Program loudness (LUFS)
  - Incomplete Content

    Sound (silence)

    Image (white and black film sections)
- Helpful for future archive content re-use
  - Select content based on AV quality
  - Provide hints when digital restoration is needed

How does the QC solution help us?

- The user interface of VidiCert gives you an impression of the file in an instant:
  visual and audio defects and quality measures are easy to overlook without the need to watch
- The human eye can be trained easily to the user interface
- All detected defects can be looked at directly
- The surface is configurable for personal needs
- Integrates very well in our FDS managment software, thus avoids organisational overhead
- AV deficiences are documented for better re-use of archived content
- Saves us at least two third of the QC time

Conclusions

- A well-thought set up of the digitisation project is mandatory
  - Material workflow
  - Quality control approach
  - Workflow/process management
- Spot checking QC is definitly not enough
- Partial QC automation saves time and manpower for BR and service provider
  - Detailed automatic and interactive detection functions helps in finding the origin of an issue
  - Overall complaint rate could be reduced from ~25% at beginning to ~5% now
- Full automation of QC cannot be realised, job is too specific and complex
- Very beneficial cooperation between BR and JR

Thank you!

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