Retrospective
Image and Sound Quality Control
in the Large-Scale Film Digitisation Project
at Israeli Public Broadcasting Corporation

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Film collections: legacy of IBA old public TV 1968-2017 + Educational TV 1966-2018
Total : around 19,000 reels.

- **Original time frame - <mark>3 years 2019- 2022</mark>**

- **Extension period for ending film digitization**   **2023** → **2025-QC** →

- **Execution: outsourcing by public tender. Service provider settled their facilities in the archive building**

- **File formats**
  - **MXF OP1A / MPEG2 422 IBBP/12 I25**
  - **DPX – RAW (Lossless long time preservation on LTO tapes)**
  - **PROXY- mpeg 4 h264 (produced by IPBC MAM)**

Working flow by archive digitisation team

- Batch preparation 200-300 hours per month

- Sorting films by package (envelopes/cannes)

- Barcoding each film

- Cataloging if needed/correcting data

- Register data in designated "batch program"

- Packing in boxes. Each box got batch number & box number

- The batch is followed by an excel file with the data of all films

Batch Manifest

	object barcode	objectID	media_type	media_type	reel_count	audio_reel	case barc	batchbarc	isUrgent	item title	recorded_	Media_co	program	broadcast date
1														
2	EI17800198	1978-198	Film	פילם סינגל מגנט	1	0	CASE-865	BTCFR017	0	סאדאת בכנס	00:15:00		מבט	01/01/1978
3	EI17802968	1978-2968	Film	פילם דאבל סיסט	1	1	CASE-865	BTCFR017	0	סאדאת מבק	00:15:00		מבט	01/01/1978
4	EI17808053	1978-8053	Film	פילם דאבל סיסט	1	1	CASE-865	BTCFR017	0	על ההתפתר	00:14:17		חדשות ערב	01/01/1978
5	EI17903423	1979-3423	Film	פילם דאבל סיסט	1	1	CASE-865	BTCFR017	0	רכבת לאורון	00:15:00		שקט משדרי	01/01/1979
6	GI17901613	1979-1613	Film	פילם דאבל סיסט	1	1	CASE-865	BTCFR017	0	האתנומוסיקו	00:40:00		מדע ודעת	01/01/1979
7	SI17906246	1979-6246	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	חברי סיעות	00:01:57		לוויין	16/07/1979
8	SI17906249	1979-6249	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	חצי מיליון אי	00:01:30		לוויין	17/07/1979
9	SI17906251	1979-6251	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	תוכנית מוצע	00:01:54		לוויין	12/07/1979
10	SI17906252	1979-6252	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	אמריקאים מ	00:02:26		לוויין	16/07/1979
11	SI17906414	1979-6414	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	מאות אלפי כ	00:02:00		לוויין	21/07/1979
12	SI17906419	1979-6419	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	אלפי תומכיכ	00:02:05		לוויין	23/07/1979
13	SI17906420	1979-6420	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	משבר בניקו	00:01:38		לוויין	01/01/1979
14	SI17908108	1979-8108	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	מנהיג הדת	00:01:23		לוויין	27/09/1979
15	SI17908162	1979-8162	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	אלפי סטודננ	00:02:13		לוויין	23/09/1979
16	SI17908277	1979-8277	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	סטודנטים מ	00:01:44		לוויין	28/09/1979
17	SI17908283	1979-8283	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	דוברים בדיון	00:02:40		לוויין	26/09/1979
18	SI17908368	1979-8368	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	דובר החזית	00:01:57		לוויין	09/10/1979
19	SI17908373	1979-8373	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	תושבי פנמה	00:01:39		לוויין	04/10/1979
20	SI17908415	1979-8415	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	מצעד צבאי	00:02:16		לוויין	07/11/1979
21	SI17908447	1979-8447	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	קונגרס תבר	00:01:39		לוויין	22/07/1979
22	SI17908452	1979-8452	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	מדענים חוק	00:03:00		לוויין	01/01/1979
23	SI17908456	1979-8456	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	סמינר בינלא	00:02:12		לוויין	05/10/1979
24	SI17908457	1979-8457	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	הגעה למוסד	00:00:56		לוויין	05/10/1979
25	SI17908458	1979-8458	Film	פילם סינגל אופט	1	0	CASE-865	BTCFR017	0	התנגשויות ב	00:02:58		לוויין	05/10/1979

Service provider acts

- Replacing all splices, cleaning

- Assembling short films (1-5 minutes)

- Scanning picture with "Lasergraphics ScanStation"

- Synchronizing picture & sound via "DaVinci Resolve" editing software

- Matching file ID to metadata ID (should be the same)

- Operating QC data - checking standard compliance: file format, bit stream & etc. (Vantage) & filing Excel report to archive with QC remarks.

- Transmitting online MXF to IPBC servers

- Preparing DPX copies on LTO tapes

Archive QC – so, what went wrong?

- Short unsuccessful pilot with the provider in the beginning of the project!
  Don't skip a serious thorough pilot!

- Manual QC by archive team failed due to several reasons:

  - We could dedicate only 2 people for manual QC

  - Executing spot checks - NOT WORKING!

  - Lack of employee's technical knowledge

  - Fail in data analysis of the QC reports by superiors.

- What was positive? **Metadata content check!**☺

Which image and sound issues encountered?

- Over exposure, dark picture

- Low contrast

- Macroblocking

- AV Sync

- Frame jumps due to bad splicing work

- Dirty frames

- Metadata not matching the visual content

- Noise/grain

- Unsteadiness

- Sound level

Looking for effective image and sound QC solution

- Defining the problematic delta of 6 first months of the projects where we realized the working process of the provider produced failed files.

- Estimating the remaining time span left of the project.

- Realizing we have to find a semi-automatic QC process that will enable us to conduct a thorough check of all file and not only spot check.

- Finding an efficient way to collect the QC data.

- Remembering Peter's presentation in Venice about VidiCert QC ☺!
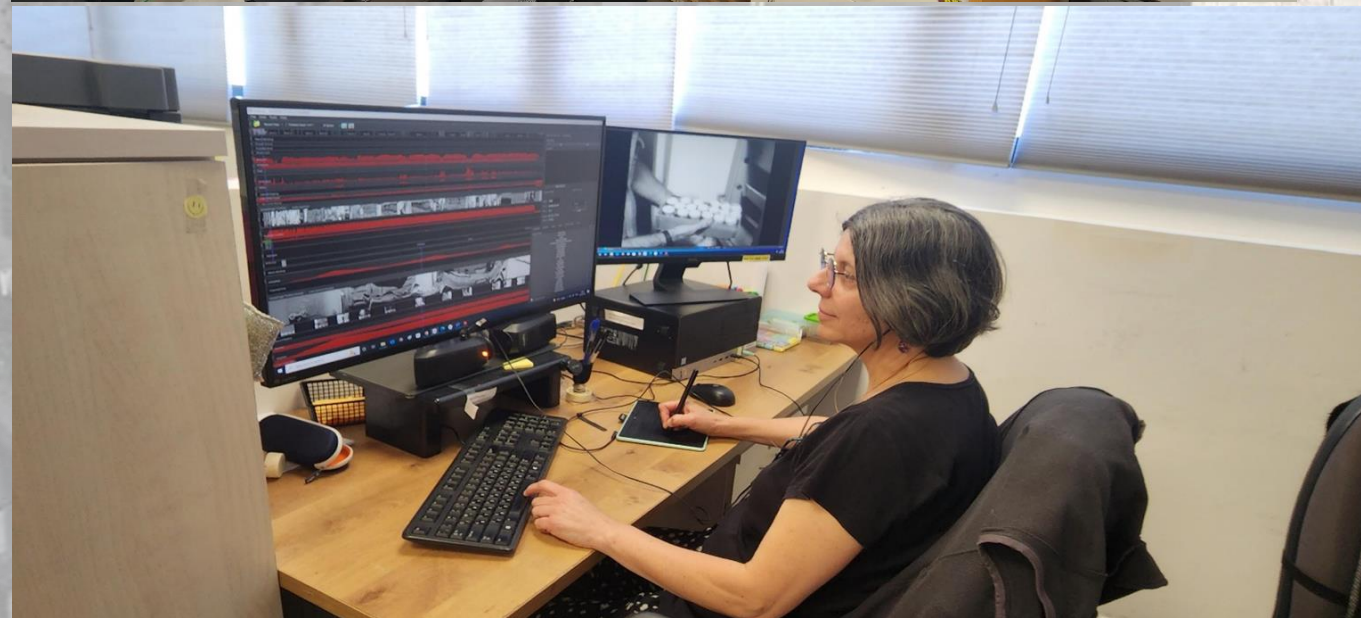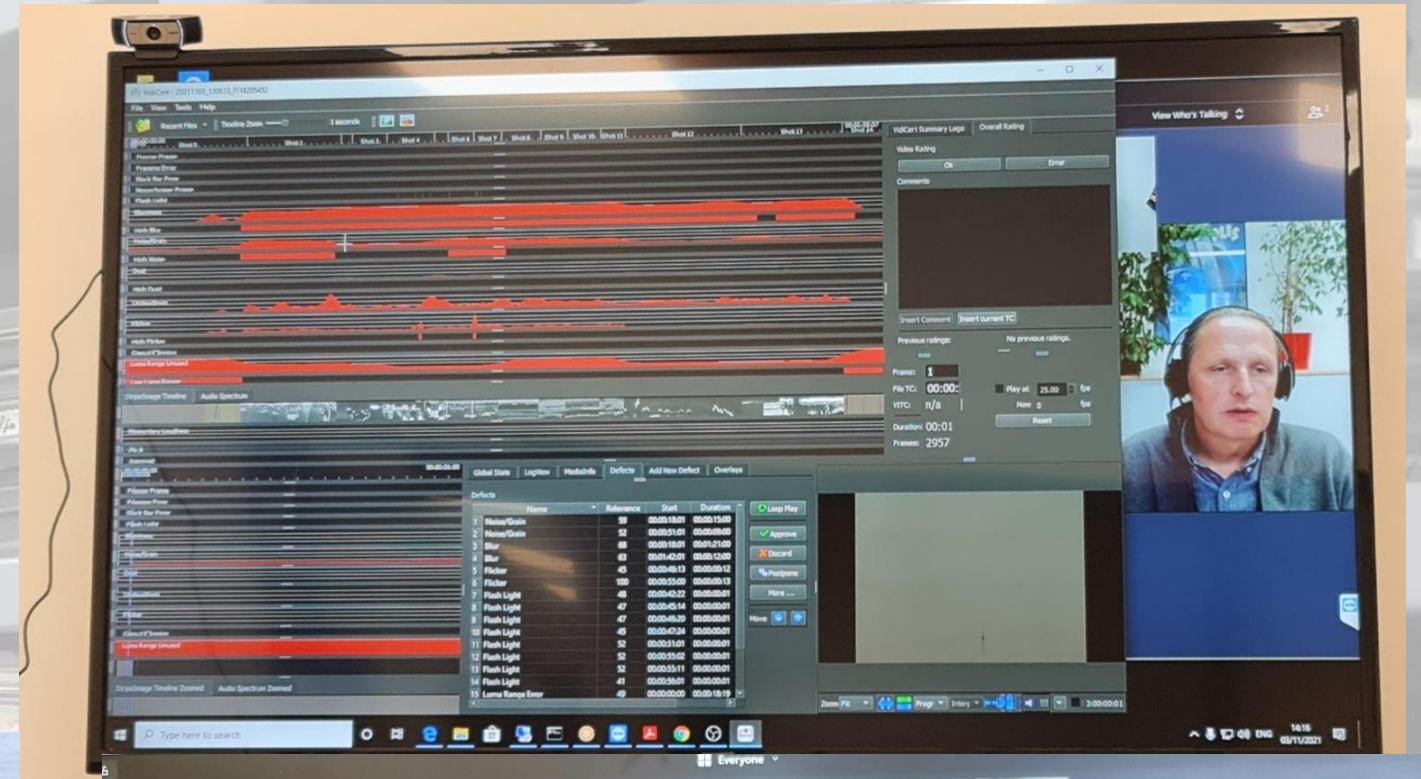
Due to Corona restrictions-zoom guidness...
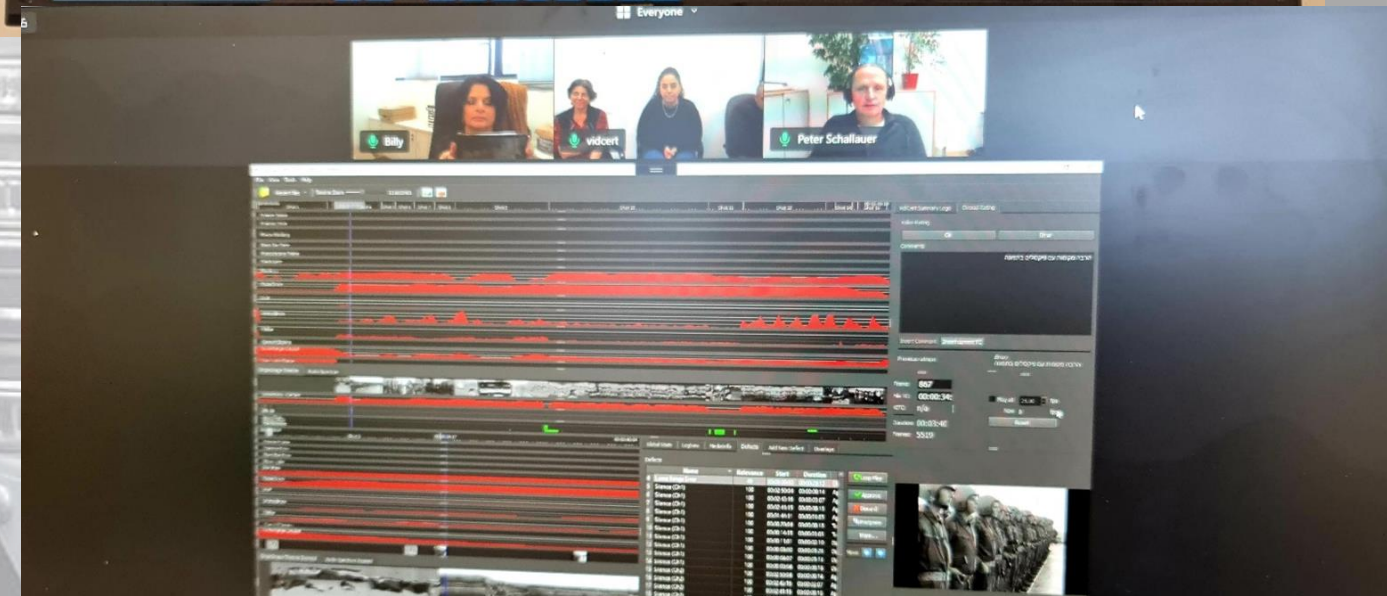
How does it work?

What has been detected?

Image and Sound QC
How does it work?

VidiCert Film Scanning QC
by IPBC

Film Scanning
by Service Provider

VidiCert Analyser
Automatic Analysis

VidiCert Summary
Interactive Verification & Decision

Scan Data

Accept

Reject

Archive & Use
Documentation
XML+PDF Report

Archival Package

Restore
Report

DIAMANT-Film
Restoration

Reject
PDF Report
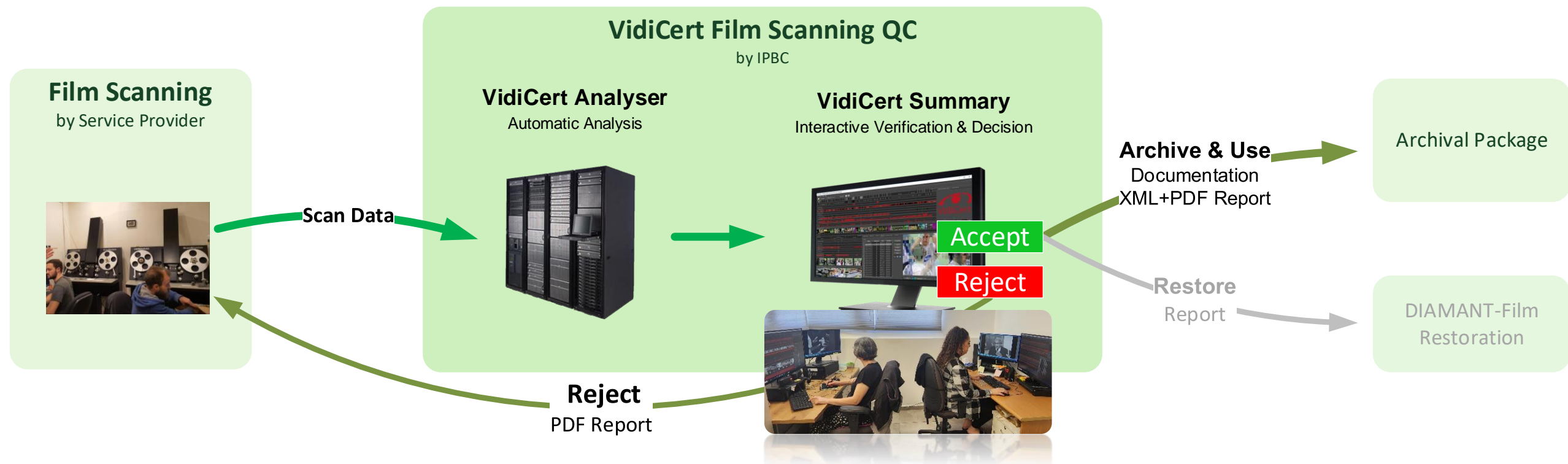
- Scanning with two scanners in two shifts, mastering with DaVinci Resolve

- Automated 24/7 defect analysis
- Specialised detectors for film scanning issues

- Interactive defect verification with high speedup
- And with full QC coverage
- Two QC stations

- Documentation of scanning quality
- Integration with digital restoration

Image and Sound QC Functions @ IPBC

- Crushing/Clipping (Under&Over Exposure)
- Framing Error/Frame Jump
- Unsteadiness
- Out of Focus / Blurriness
- Dust/Dirt/Hair
- Freeze Frame
- Film Grain Noise
- Flicker, Flash Light
- Contrast/Luminance Range Used
- Black & Single Coloured Frames
- Bad Splices
- Bad Cropping
- Crookedness
- Pull-Down Errors
- Wrong Playback Speed
- :

- Silence
- Loudness, Audio Level
- Superimposed Sound (e.g. Hum)
- Wrong Track Allocation
- AV Synchronicity
- :

Interactive Image and Sound QC Functions @ IPBC

- 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

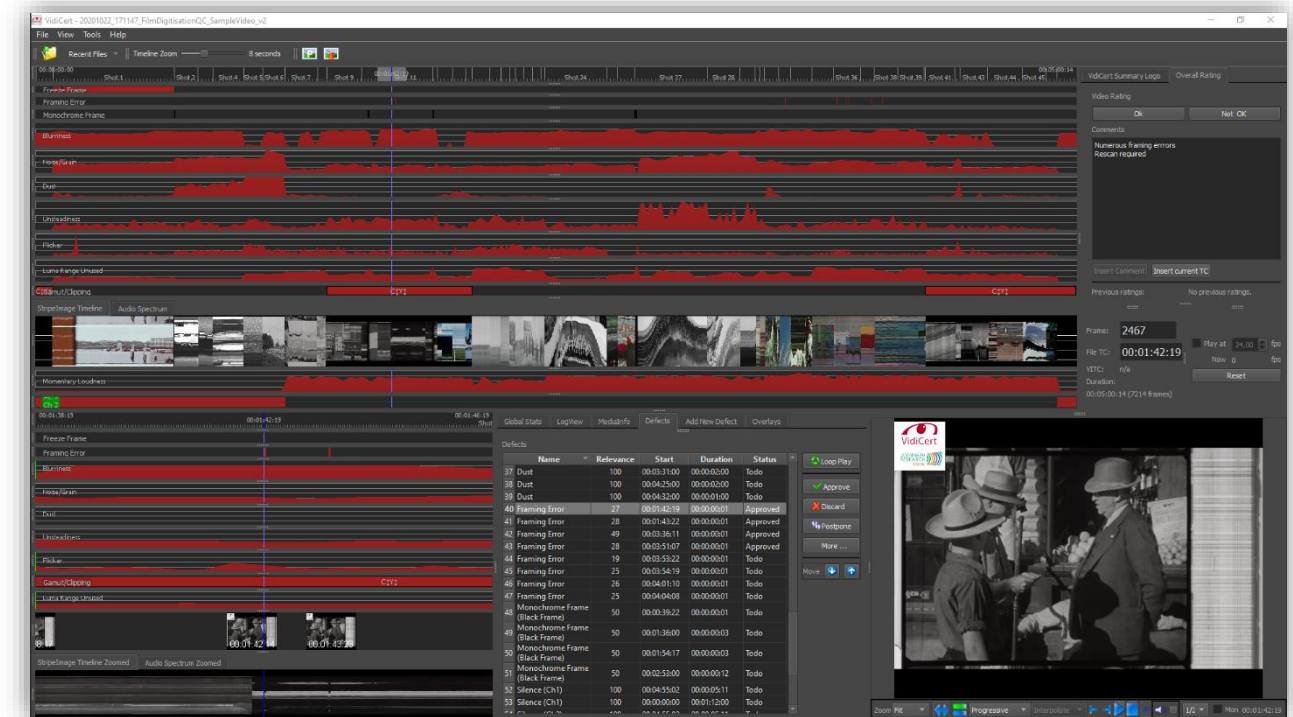 - Human readable pdf

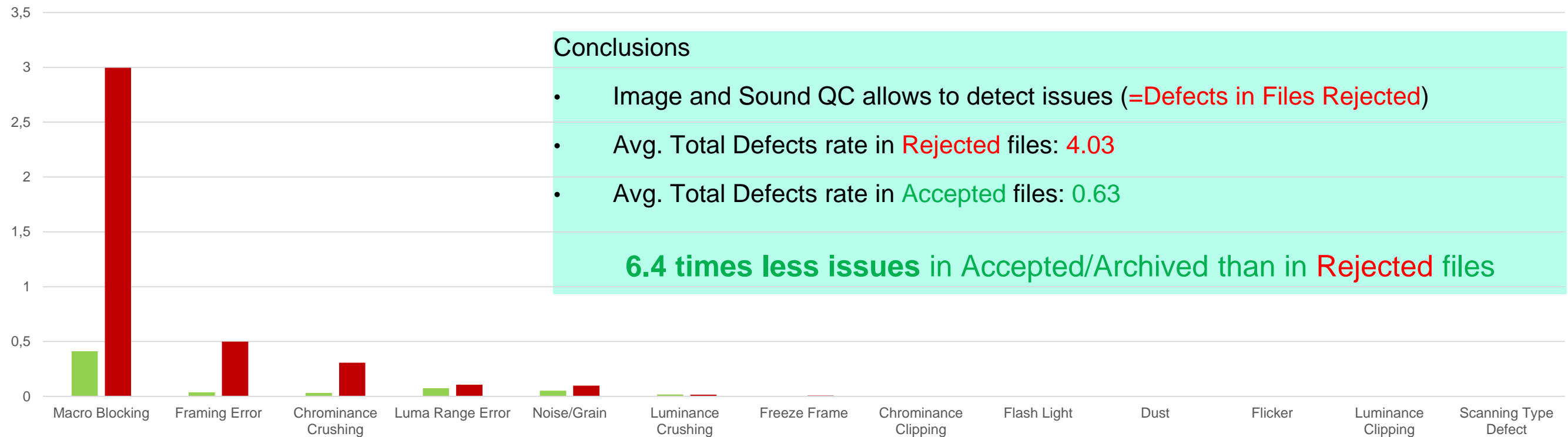- DIAMANT Restoration Report

- Defect Statistics
  - 11/2021 – 09/2022
  - 10647 reels/files
  - 844 hours QC'd
  - Avg. file/reel duration: 4 min. 45 sec.
  - Comparison between
    - Files/Reels Accepted
    - Files/Reels Rejected

Image and Sound QC
Most Frequent Issues and Effectiveness

Avg. Defects per File in Files Rejected vs. Files Accepted

Conclusions

- Image and Sound QC allows to detect issues (=Defects in Files Rejected)
- Avg. Total Defects rate in Rejected files: 4.03
- Avg. Total Defects rate in Accepted files: 0.63

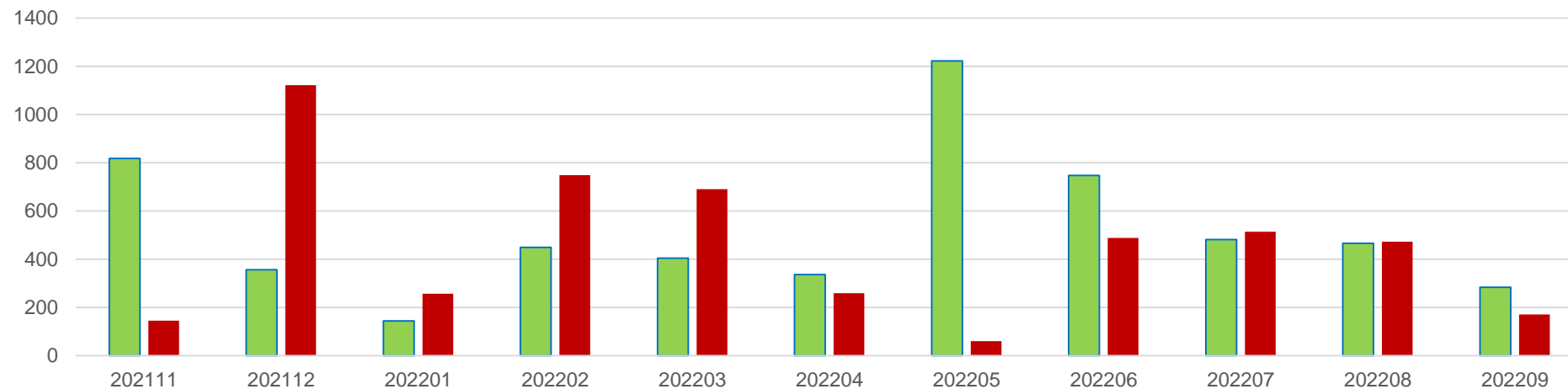**6.4 times less issues** in Accepted/Archived than in Rejected files

- Qualitative documentation of additional defects
  - Splice Bumps - often
  - AV Synchr. Errors, Scanning Unsteadiness - rather seldom

Retrospective Film Scanning QC - Operations Overview

#Accepted and #Rejected Files per Month

- Shows retrospective QC operations; no direct temporal relation to scanning operations!
  - Focus of QC on first scanned films (film from the 80s, seemed to be „easier" than 60s and 70s)
  - 2021/11, 2022/05: Accepted mainly because content not so important for IPBC (no copyrights)
- Total #Files/Reels Accepted: 5715
- Total #Files/Reels Rejected: 4932

-> Do QC as early as possible after scanning!!

Conclusions

- Spot checking is not enough

- Make sure to plan for image and sound QC before starting your project

- Keep professional employees to do the QC –we hired film editors & audio technicians

- Semi-automatic QC with VidiCert enabled us to produce efficient process to detect the problematic files/scans and send them back to the provider for re-scan or re-master

- Once we got a clear picture of failed files (~46% after checking 10,000 reels) we could renegotiate with the scanning provider a correction plan

Thank you for your attention!

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