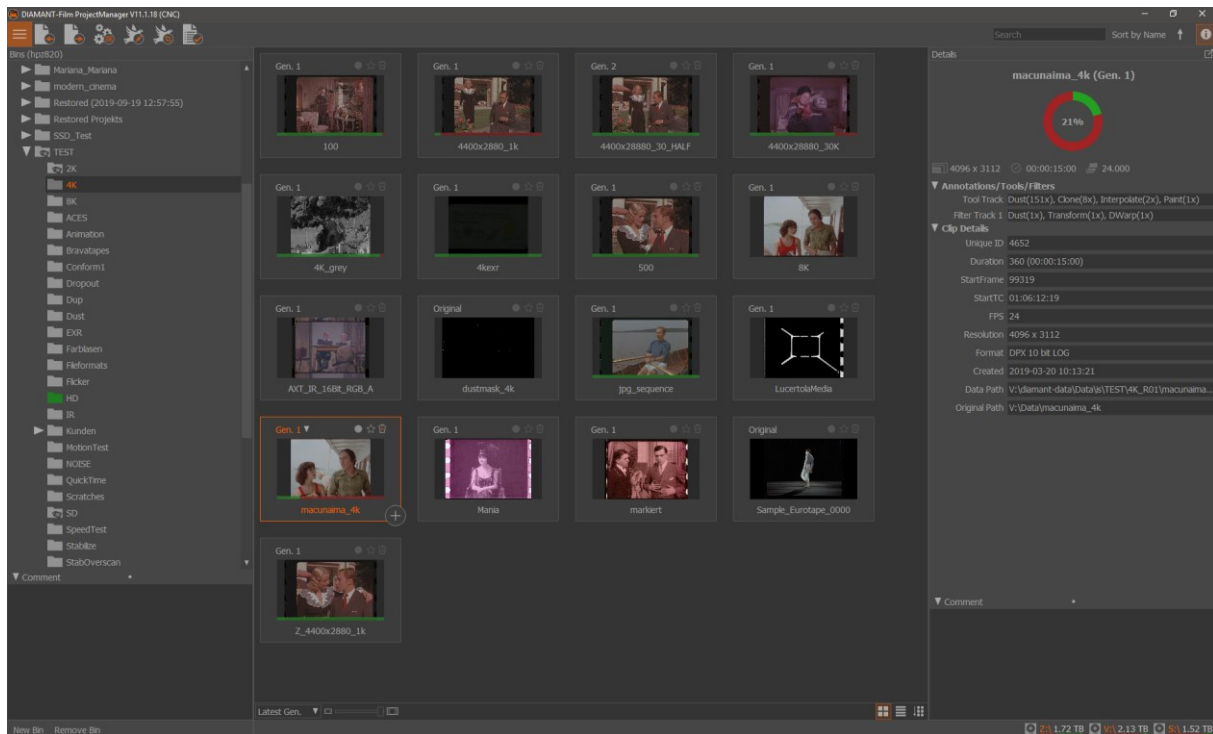


Workflows for DIAMANT-Film Restoration

Workflow1 – Standard user oriented workflow

In the standard user oriented workflow the ProjectManager application is used for the general project management tasks.



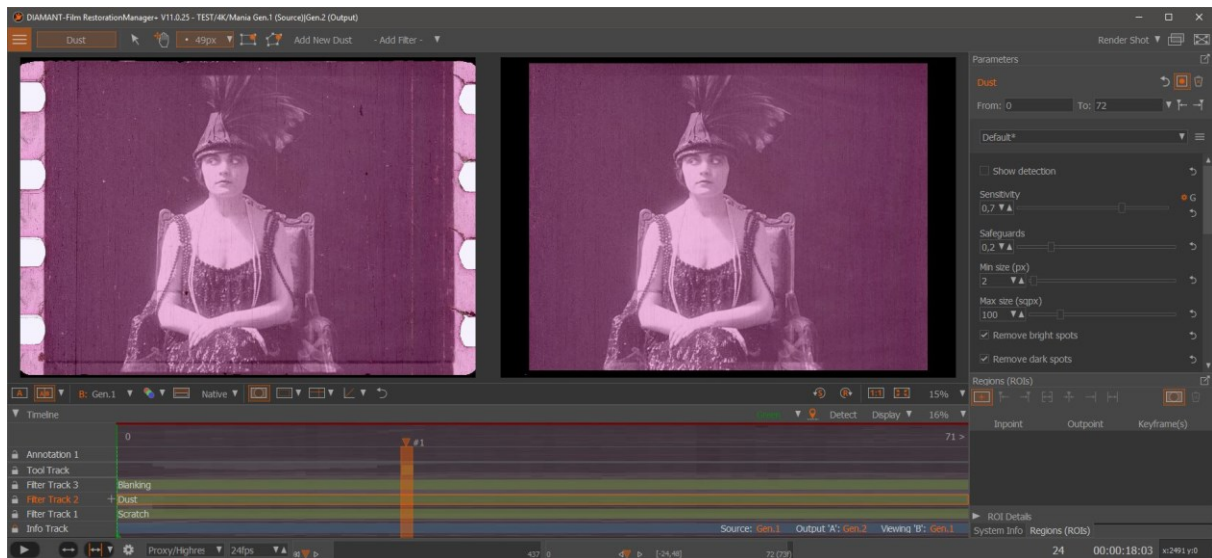
The image sequence or video is imported here via the import button or via drag&drop onto the project panel. All imports are per reference and the restoration is done non-destructive. The changed images are written to a pre-configured data repository.

The restoration itself is done with the app called RestorationManager+. This app allows for interactive, semi-automatic and automatic restoration. Interactive restoration means that the user can apply tools like clone, interpolate, inpaint and many more via a brush strokes or rectangular ROIs or polygons. Semi-automatic means that the user can apply a filter on a certain timerange with specific parameters and ROIs if necessary. Automatic means that the user applies a filter over the whole scene or sequence without any other interaction.

Wie arbeiten aufgrund der Allgemeinen Bedingungen für den Verkauf und die Lieferung von Software - Support Leistungen, sowie für Dienstleistungen in der Informationsverarbeitung durch Rechenzentren und den Verkauf und die Lieferung von Organisations-, Programmierleistungs- und Werknutzungsbewilligungen von Softwareprodukten - empfohlen vom Fachverband Unternehmensberatung und Datenverarbeitung sowie vom Bundesministerium des Maschinenhandels, Berufsgruppe Büromaschinenhandel und bei uns zur Einsicht liegenden Fassung.

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The rendering of the tools and filters is done within the RestorationManager+ normally, but can be outsourced to an external render client.

At the end of the restoration, the restored sequence is exported via the Export function in the MovieManager.

Workflow2 – Standard Batch Rendering

As in workflow 1, the material is imported via the ProjectManager. A restoration project can be prepared similar as in workflow 1 with the RestorationManager+. Here the focus is on the semi-automatic and automatic filters. But instead of rendering the project from the RestorationManager+, the rendering will be started from the ProjectManager via the “Batch Render” icon.

The advantage here is that it is possible to setup several projects/clips at the same time and render them in batch mode one after the other. The render jobs are scheduled in the JobManager which is responsible for the automatic rendering. This is especially useful if rendering in the background or rendering over night or weekend should be scheduled. Also rendering on a render farm can be configured.

It is also possible to add an export which will be automatically started after the rendering for a clip has finished.

The batch rendering mode can be also used to re-render a project later one. This is particularly useful if only the project metadata backup is kept and the rest of the project has been deleted. So if at a later point the project needs to be re-rendered this is easily possible with the batch renderer.

DIAMANT-Film Batch Renderer

Cut	Proxy	Sequence Name	State	Progress	Duration	First	Last
<input type="checkbox"/>	<input type="checkbox"/>	TEST/4K/4400x28880_30K_t1 (Original)		0%	30296	0	30295
<input type="checkbox"/>	<input type="checkbox"/>	TEST/4K/4K_4584x3216_438 (Original)		0%	438	0	437
<input type="checkbox"/>	<input type="checkbox"/>	TEST/4K/ARRI_4400x2800_500 (Original)		0%	504	443000	443503
		R01		0%	504	443000	443503

Workflow3 – Advanced Batch Rendering

As in workflow 1, the material is imported via the ProjectManager. After the import the Batch Renderer will be started directly on the imported clip or clips. It is possible to add filters directly from the batch renderer with a certain existing pre-set. It is also possible to insert a new filter on multiple clips simultaneously.

Alternatively it is possible to use a template restoration job. Such a template can be applied on multiple clips. Simple copy and paste from filters from one clip to the other(s) is possible also. This allows to create a master job and copy&paste the filter(s) onto multiple clips.

As in workflow 2 the automatic export could be configured here. Alternatively it is possible at the import time to set a render target location. This means the rendering will be done automatically to this directory instead of the internal cache data paths. This works at the moment only for single image sequences like a DPX sequence but not for videos.

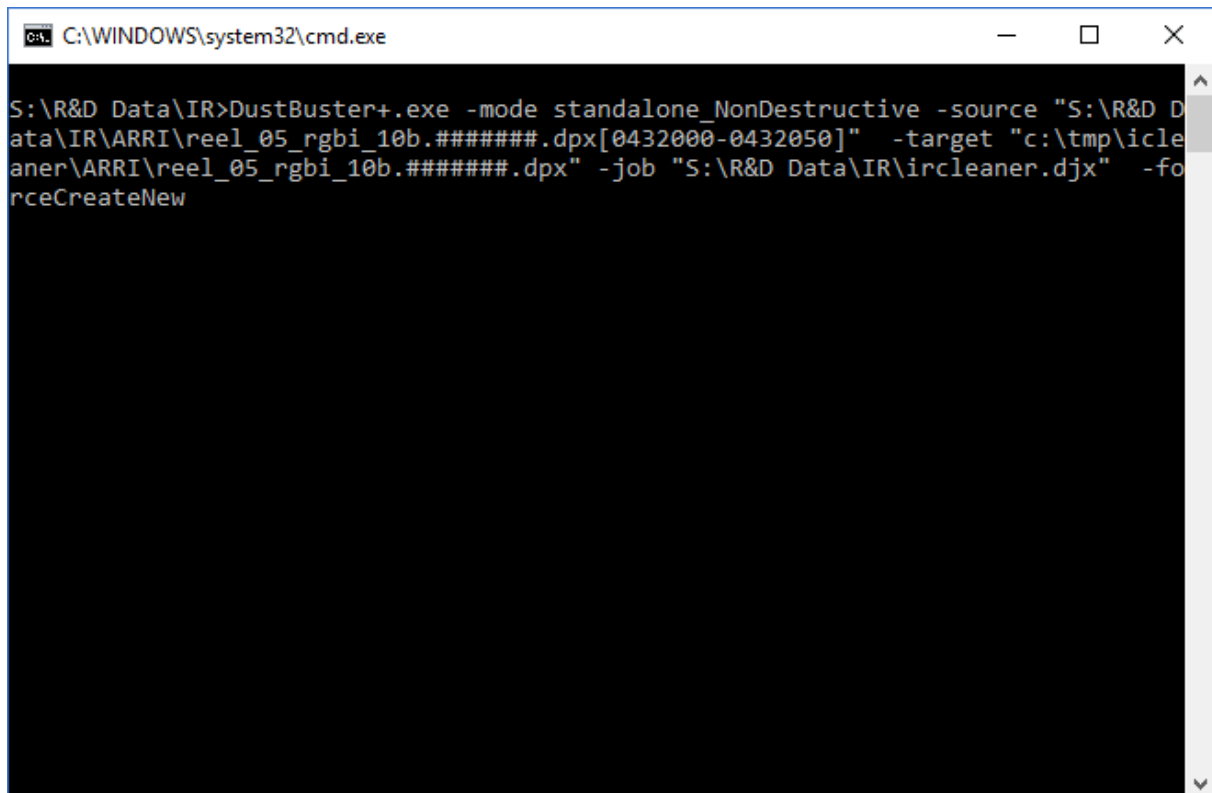
All the rendering is done in batch mode in the background.

This workflow is particularly useful if there is a large quantity of videos which needs the same processing.

Workflow4 – Commandline Tool Integration

The commandline interface allows the creation and rendering of restoration projects via a commandline app. A typical commandline call would specify the source path, a restoration template file and a target path. The restoration template is a XML file holding the information which filters with which pre-sets should be rendered. It is also possible to overwrite certain parameters if this should be necessary. Progress and errors are reported back on stdout and stderr as well as with exit codes. The commandline app allows simple integration of the DIAMANT-Film restoration render engine into 3rd party workflows.

An example command line looks like:



```
C:\WINDOWS\system32\cmd.exe

S:\R&D Data\IR>DustBuster+.exe -mode standalone_NonDestructive -source "S:\R&D Data\IR\ARRI\reel_05_rgb1_10b.#####.dpx[0432000-0432050]" -target "c:\tmp\ircleaner\ARRI\reel_05_rgb1_10b.#####.dpx" -job "S:\R&D Data\IR\ircleaner.djx" -forceCreateNew
```

An example Diamant job xml (.djx) file looks like:

```
<DIAMANT_FILM_RESTORATION_JOB Version="0.1">
  <Operations>
    <Operation Name="ircleanerFilter" Track="1" Profile="Default">
      <Parameters>
        <Parameter Name="irMaskMode">embeddedMask</Parameter>
        <Parameter Name="irMaskMaximalSpotSize">100</Parameter>
        <Parameter Name="irMaskThresholdMethod">local</Parameter>
        <Parameter Name="irMaskThresholdLocal">1</Parameter>
        <Parameter Name="correctionMethodMicro">auto</Parameter>
        <Parameter Name="correctionMethodScratchesHoriz">resamplehoriz</Parameter>
        <Parameter Name="enlargeScratchesHoriz">0</Parameter>
        <Parameter Name="enlargeMicro">0</Parameter>
        <Parameter Name="correctionMethodScratchesVert">resamplevert</Parameter>
        <Parameter Name="correctionMethodRest">repair</Parameter>
        <Parameter Name="irMaskSpatialOffset">0 0</Parameter>
        <Parameter Name="enlargeMini">0</Parameter>
        <Parameter Name="enlargeRest">0</Parameter>
        <Parameter Name="correctionMethodMini">repair</Parameter>
        <Parameter Name="enlargeScratchesVert">0</Parameter>
      </Parameters>
    </Operation>
  </Operations>
</DIAMANT_FILM_RESTORATION_JOB>
```

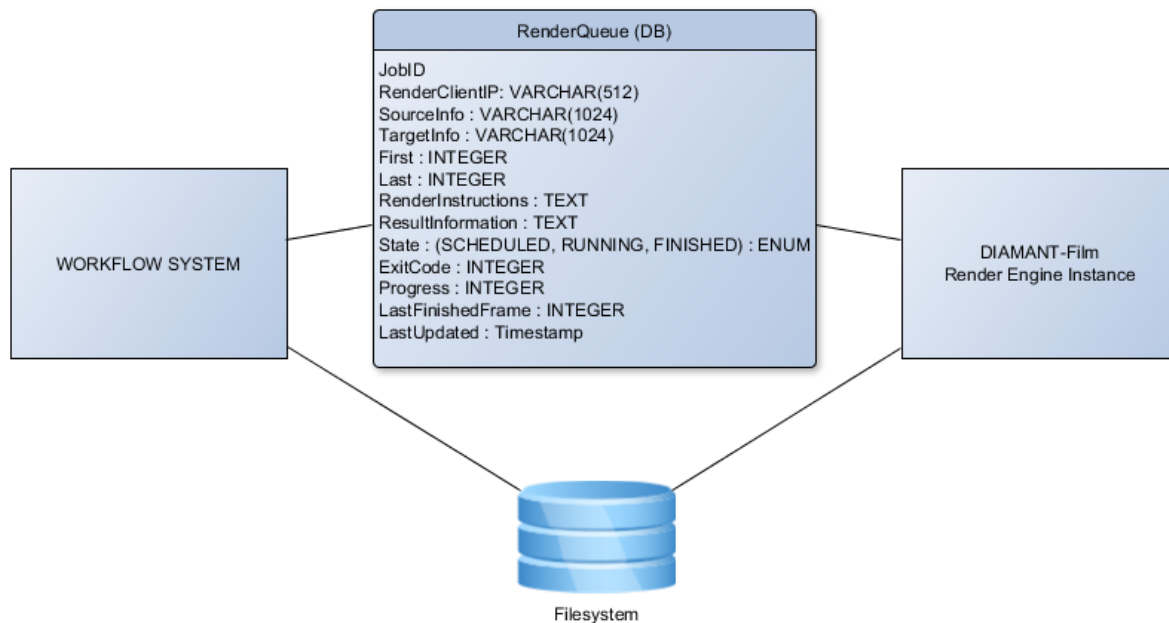
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Workflow 5 –Database Queue

We also support a workflow for automatic rendering where the tasks/jobs are queued into a central database queue and DIAMANT-Film will retrieve the jobs from there and will report back progress and status.



Workflow 6 – Watch Folders

There are two ways how watch folders can be used.

Watch folder for job files

The workflow system can place Diamant job xml (djsx) files into a watch folder. The djsx file would contain the information of the source material, the filters and parameters to be used and the final target file information.

Watch folder for video files

The workflow system can place a video into the watch folder and along with it a Diamant job xml template. The template file is named as the video but with the extension “.djsx”. It is possible to place a file called “default.djsx” into the watch folder. The default.djsx template would be used as job information for those videos which don’t have a dedicated “.djsx” file. It is possible to set up several watch folders.

Workflow 7 – REST API

We have developed a REST API based which allows to use the DIAMANT-Film Restoration as a remote service. This API allows to integrate DIAMANT as a service into existing workflows.

WorkflowN – Any other workflow

We are quite flexible and fast in adapting our tools and apps in order to fit into existing workflows. Please let us know what you would need and we can make a proposal how to implement the needed workflow.