Cat, Dog, Bird or Turtle?
Comparative study of Analogue and Digital Radiography Systems at SRAL, Maastricht (NL)

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Introduction

Until 2022, SRAL used an industrial analogue x-radiography (XR) system. An irreparable defect led SRAL to research and try out the alternatives. Consequently, SRAL acquired the medical ECONEt PXP-40HF X-ray generator and an LWTC-F VET digital panel detector from Shenzhen Lanmage Medical Technology. This system operates on software for veterinarians and has pre-sets for cats, dogs and smaller animals. Brief observations are presented here.

Fig. 1

Machine

Analogue XR observations	Digital XR observations
❑ Single-use developing materials (fluids, films) (Fig. 1)	Images are acquired via a multi-use digital panel detector (Fig. 2).
❑ Manual capture area marking (Fig. 1).	Illuminated capture area (Fig. 3).
❑ Standard SRAL film size 30 x 40 cm, has greater image distortion near short lateral edges.	Detector image 40 x 40 cm, more coverage in fewer shots, same image distortion near all edges.
❑ Beryllium filter.	Aluminium filter.
❑ kV, mA, sec.	kV, mAs.

Fig. 2

Fig. 3

Quality

Analogue XR observations	Digital XR observations
❑ Higher resolution image possible (up to the resolving power of the film).	Resolution is dependent on the detector, with limited upscaling.
❑ More soft and diffuse appearance, possibly due to beryllium filter (Fig. 4).	A more crisp overall appearance simplifies interpretation (Fig. 5).
❑ More information on surface effects, less about the deeper structure.	More detail of structural composition (nails, wood support, textile). Surface effects stand out less but at the gain of more.

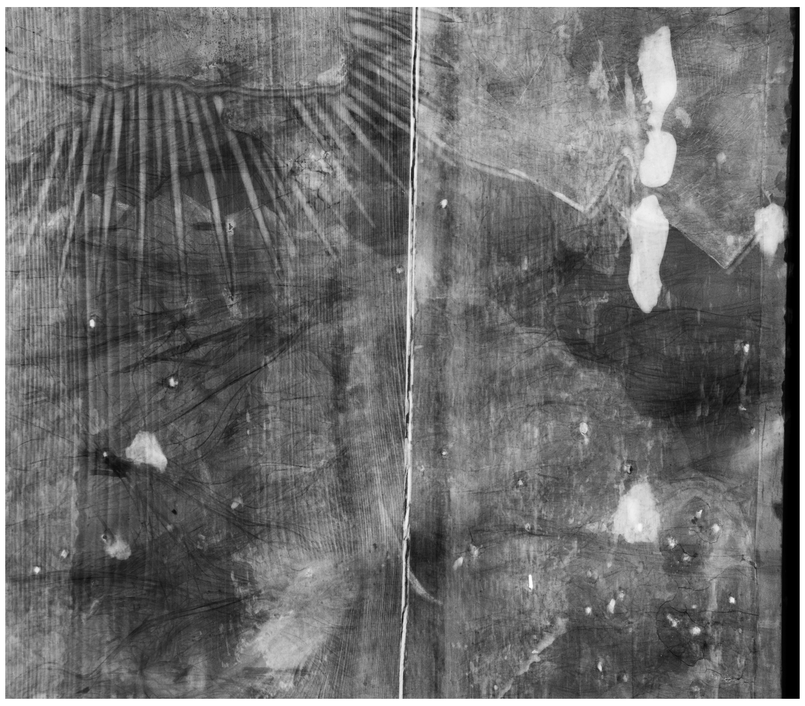

Fig. 4 Analogue x-radiograph of a 15th-century Spanish panel before treatment, captured at 30 kV, 10 mA, 40 sec. *The Last Judgement*, oil and tempera (?) with gilded pastiglia (133 x 59 x 4,5 cm). Suermondt-Ludwig Museum, Aachen, Germany. Image: SRAL 2020 ↑

Fig. 5 Digital x-radiograph of the same panel during treatment, captured at 40 kV, 10 mAs. Image: SRAL 2023 →

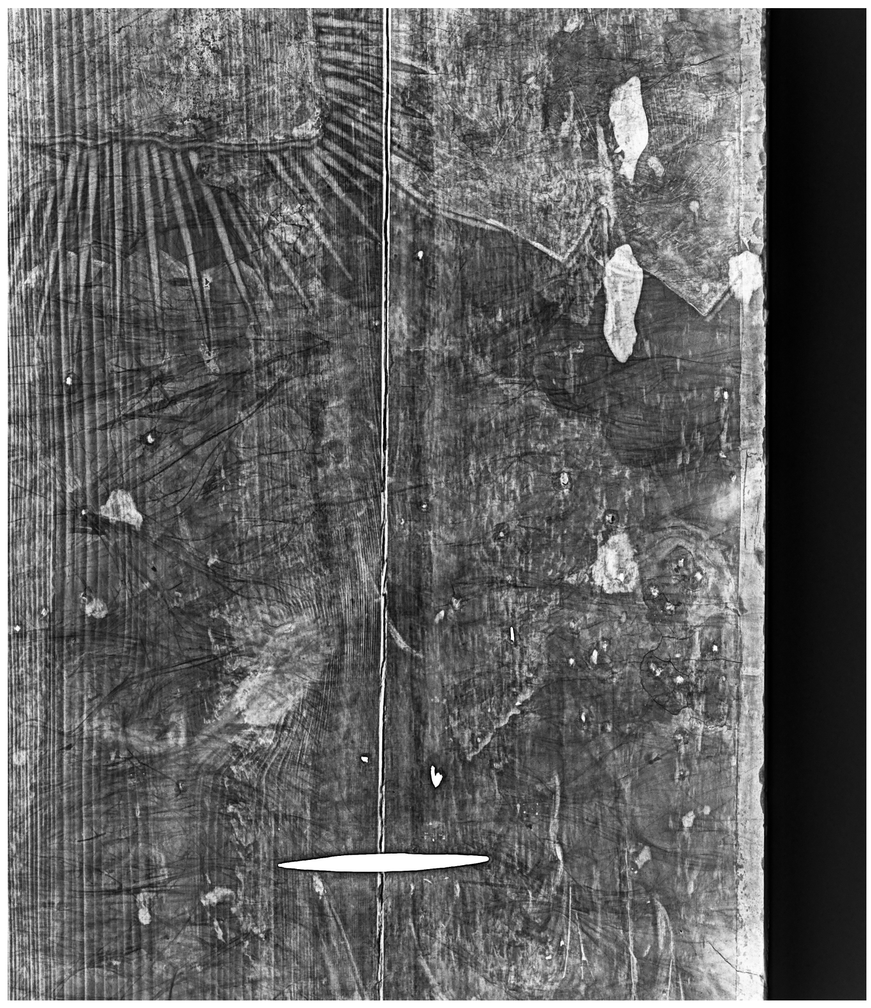

Fig. 6

Image processing

Analogue XR observations	Digital XR observations
❑ Film development in a darkroom followed by data analysis on the illuminator (Fig. 6).	Faster capture with immediate digital XRs – more trials for better results (Fig. 7).
❑ Digitisation of film for further utilisation (such as in image cubes).	Direct digital output as DCM (DICOM) and common image file formats.

Fig. 7

Conclusion

The new digital XR system provides major advantages when compared to the analogue version. SRAL will continue testing the animal pre-sets along with different filters to achieve improved digital data. Standardisation will provide guidelines for acquiring XRs, which may be of interest to institutions that face the same shift to digital XR as SRAL.

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