



Fotolabor M GmbH  
Rotebühlstr. 51 a  
70178 Stuttgart  
Telephone: 0711 / 66 98 88  
Telefax: 0711 / 66 98 89  
Data: 0711 / 66 98 87  
e-mail: mail@fotolabor-m.de

## CASE STUDY: Digitising plans of the fort for Mainz city archives

### 1. Plans of the fort in Mainz City Archives

Mainz history books are filled with story after story about military exploits in the area. As early as the 12th and 13th century B.C, a legionary depot was built in the Kästrich area of the old town. This served as a foundation for the later town. Between 1620 and 1918 Mainz was a fortified town with its own garrison. During this 300 year period, four different fortification lines were built, starting with the city ramparts, then the baroque fortress, the military camp belonging to the 'Bundesfestung' (Federal Fort), and finally the modern bunkers of the early 20th century.

'Mainz and the military' flows off the tongue like a fixed term, as captured by Goethe when he stated that, "The inhabitant of Mainz shall not seek to deny himself, that he for time everlasting resides in a military outpost: old and new ruins remind him of this."

But it is not just the "old and new ruins" – referring to the more or less intact architectural memorials of the city's military history – that are reminiscent of the city's past. There are also the plans of the old fort, handed on by previous generations and now kept in the picture and plans collection in Mainz city archives.

These date back to the days of the 'Plankammer' (the planning chambers at the fort of the French and the electoral prince), the Federal Fort (1815-1866), the Prussian Fort (1866-1873) and the Mainz fort of the German Reich (until 1919). The older plans were kept in the normal inventory of plans, but the 19th century fort plans are still to be found in numbered files in keeping with the original system. In total there are around 2500 plans captured in a special directory, which is largely based on the directory kept by the fortification authorities. This inventory of plans is invaluable for people carrying out research, especially historians, town planning experts and architects, who are often charged with municipal renovation projects, issues relating to preservation orders, the conservation of historic monuments, and even reclamation projects on old military land.

But the frequent rounds of research have started to leave their mark. Nearly half the plans have been badly damaged so it would be irresponsible to make these available to more researchers, for preservation reasons. Some plans have been torn, others have fold marks. Some are so badly tattered that they resemble a jigsaw puzzle rather than a valuable source of historical data.

The recent growth in interest in preserving old military buildings, as witnessed by bodies such as the non-profit organisation 'Initiative Zitadelle Mainz e.V', acts as a catalyst not only to preserve bricks and mortar from Mainz's history for posterity, but also those on paper.

### 2. The project

In cooperation with two companies, Cruse from Rheinbach and Fotolabor M from Stuttgart, the city archives embarked on a pilot project aimed at safeguarding a significant proportion of the old fort plans. Simultaneously, it was planned for the first time to use a new process for creating long-term archives using complex digital imaging on microfiche.

As part of a sponsorship deal, for four months the Rheinbach-based company Cruse bore the costs of a large format DIN A0 scanner which was lent to the city archives to scan in the most historically important fort plans, or at least those in greatest need of preservation. The scans were then stored temporarily as TIF files on DVDs before forwarding to Fotolabor M in Stuttgart. Here they were transferred onto premium quality Ilford micrographic film using an RGB colour laser. In this format they are ideal for long-term archiving purposes.



Fotolabor M GmbH  
Rotebühlstr. 51 a  
70178 Stuttgart  
Telephone: 0711 / 66 98 88  
Telefax: 0711 / 66 98 89  
Data: 0711 / 66 98 87  
e-mail: mail@fotolabor-m.de

## CASE STUDY: Digitising plans of the fort for Mainz city archives

The TIF files were then converted into JPEGs and burnt onto DVDs to present in the reading rooms at the city archives. As a result, the scanned plans can now be looked after carefully while people access digital images via computer. As part of the project the valuable originals were placed in acid-free folders and re-archived (according to a different formatting criteria) to shield them from further damage.

As things currently stand, it is not possible to restore plans that have already been damaged. Restoring the rest would cost between 500 and 800 euros each. The current assumption is that at least 500 plans are in need of urgent restoration but given current budget restraints it would have been completely unrealistic to ask for more than € 250,000 from municipal funds.

Therefore the only feasible option to safeguard content in its current condition was to digitise only parts of the fort plans.

### 3. The city archives' project partners

#### Cruse GmbH, Rheinbach

Cruse is a Rheinbach-based manufacturer of large format high performance scanners.

The single most important feature of these scanners is 'synchronised light technology' offered by its CS-SL series of scanners. Thanks to this technology, CRUSE SL synchronised light scanners can provide extremely high quality digitised images of archives – directly from the original. This provides archivists with the means to digitise and reproduce large archive materials in a suitable format for storage.

When the original is scanned it is placed on a special table during the whole process. Operators then pass a beam of light bit by bit over the original. As this is happening, the scanner digitises the image data ('synchronously'). The quality of images is much higher than you would expect from conventional flat-bed scanners. The special illumination process also exposes the original to a minimum of potentially damaging light sources: delicate originals only receive as little as one tenth of the amount of light normally needed for such archiving processes. Data gathered during scanning is much sharper than usual, providing much finer resolutions and much, much smaller files. This shortens processing times and takes up less disc space.

All Cruse SL Synchronised Light Scanners provide a special texture option. This allows you to achieve a realistic reproduction of features such as paint application, brush strokes and damage. The synchronised light system allows you to digitise objects up to 10 centimetres deep, without coming into contact with the original and under uniform illumination. For thicker objects, two light sources mounted along the side provide the right amount of illumination. To keep the original safely in place, the table has adjustable vacuum suckers which can also be switched off entirely. One of the advantages of Cruse scanners is that they provide extremely keen definition right up to the border by using optimised lens technology based on 100% parallel image capturing.

When digitising old documents and plans, the aim is to reproduce the original as accurately as possible. So not only should the colours be accurate, you have to be able to discern the texture of materials and relief.

Previous processes involving reprographic cameras, slides, digital photography and flat-bed scanners were time consuming, expensive and worse still: they often exposed sensitive originals to intense illumination and other, mechanical dangers. What's more, the resulting images often left a lot to be desired, and (this should be emphasised) they were not true to the original. Fine details were missed out, fine nuances on the original. Reflected light



Fotolabor M GmbH  
Rotebühlstr. 51 a  
70178 Stuttgart  
Telephone: 0711 / 66 98 88  
Telefax: 0711 / 66 98 89  
Data: 0711 / 66 98 87  
e-mail: mail@fotolabor-m.de

## CASE STUDY: Digitising plans of the fort for Mainz city archives

and shadows spoiled the reproduction.

The Cruse scanner has made all these issues obsolete. The Mainz city archives now digitises highly valuable historical plans with ultimate precision.

### Die Fotolabor M GmbH, Stuttgart

Fotolabor M is the inventor of a new, highly reliable process for the long-term archiving of digital and analogue image data. Going by the name savedpictures, their system allows you to store the contents of important historical documents as well as their colours, hues, structure and the overall visual impact – right down to the finest detail and nuance. savedpictures makes it possible to recreate images almost entirely without loss of detail. The content of digital images can be stored up to a size of 1.5 gigabyte, on film.

### The system consists of two parts:

#### 1. Ilford Micrographic Film

The first core component is the Ilford Micrographic Film which offers unparalleled resolution and (similarly unbeatable) archiving properties. According to experts, if stored properly the film should last 2000-3000 years. In fact when it was subjected to artificial ageing processes the material used in the film 'only' lasted around 500 years. Even then this was only because the medium started to break down after standing up to 75°C for 2½ years. Despite the harsh conditions, the colours still looked perfect.

The unique properties of this film have been proven time and again in scientific testing and have attracted the acclaim of archiving experts in every corner of the globe. The savedpictures system processes Ilford films along the same lines as other tried and tested methods, the only difference being the innovative RGB laser technique used to expose the film. It's safe to assume that what we know today about analogue data storage systems applies equally to digital microfiching.

#### 2. Laser Writer

The second core component is the RGB laser writer. Going down to resolutions as low as 80 lines per mm (ie: 2032 dpi) it etches image data onto the Ilford Micrographic Film in unprecedented high quality. If the original (or the digital file of the original) gets lost, the resulting analogue image can be redigitised in new quality to reflect accurately the first digital image of the original.

The savedpictures system archives images in A4 format. Depending on file sizes, each sp-page can hold between 1 and 64 files. Exposed films are archived in special acid-free polyester sleeves and stored in air-conditioned archives in the same way as standard pictures.

#### 4. The significance of the project; future expectations

The project was an ideal opportunity for Mainz city archives to digitise valuable historical documents. Previously under threat, these could now be replicated accurately thanks to the high performance scanner. With the savedpictures system it was possible to permanently side-step the typical long-term storage problems associated with digital information (as well the subsequent costs of long-term storage media).

Prior to this project, the best alternative for long-term archiving was considered to be the microfiche. This new



Fotolabor M GmbH  
Rotebühlstr. 51 a  
70178 Stuttgart  
Telephone: 0711 / 66 98 88  
Telefax: 0711 / 66 98 89  
Data: 0711 / 66 98 87  
e-mail: mail@fotolabor-m.de

#### **CASE STUDY: Digitising plans of the fort for Mainz city archives**

laser technique, hand-in-hand with Ilford micrographic, represents a quantum leap forward in long-term archiving technology.

For decades archivists have been faced with the dilemma of which replacement media to choose – analogue microfiche or digital storage technology. This dilemma has now been turned on its head. The joint project with Cruse und Fotolabor M enabled Mainz city archivists to transfer content between the two different media formats and thus tap into the advantages of both: images have now been digitised, with colours totally faithful to the originals; analogue copies are now in long-term storage and thus removed from the threat of loss.

The overall aim of this project was to see what it would be like transferring the entire archiving process into everyday practice in a medium-sized city archive, and evaluate the process – from digitisation to conversion and re-digitisation. The findings could act as a valuable catalyst to all archivists to discover for themselves this innovative service and the practical role played by modern digital technology in complex archiving projects.

Mainz City Archives  
Dr. Wolfgang Dobras  
Rheinallee 3 B  
55116 Mainz  
Germany  
Telephone: 06131/12 21 78 and 06131/12 26 56  
Fax: 06131/12-35 69  
Email: [stadtarchiv@stadt.mainz.de](mailto:stadtarchiv@stadt.mainz.de)  
[www.stadtarchiv.mainz.de](http://www.stadtarchiv.mainz.de)