

# Digitisation at the Royal Observatory of Belgium

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## ABSTRACT

In this paper we describe the digitising activities at the Royal Observatory of Belgium: the collections of astrophotographic plates to be digitised, the high-precision digitiser Damian that was built, the different national projects involved in the digitisation, the archive room, and the UDAPAC project for hosting collections of European astrophotographic plates.

Keywords: archiving, digitisation, digitiser, astrophotographic plates

## INTRODUCTION

In the pre-digital era a lot of data has been acquired. At an astronomical observatory, photographic plates of the night sky are a major source of pre-digital data. In the digital era, techniques for acquiring and handling data changed drastically. Whereas these new techniques are much more powerful and much more efficient, an adverse effect of this evolution is that the interest and know-how concerning treatment of the pre-digital data is disappearing. As a result these data are at risk of being lost or of becoming unusable.

The Royal Observatory of Belgium became aware of this risk around 2000, and since there is still in-house know-how concerning astrophotographic plates, the Royal Observatory took a number of initiatives to preserve and digitise not only their own collections of astrophotographic plates, but also other endangered European collections.

## THE UCCLE COLLECTIONS OF ASTROPHOTOGRAPHIC PLATES

The Royal Observatory of Belgium (Uccle) has acquired in the period 1908-1995 a collection of ~25 000 photographic glass plates of the night sky. They include plates taken at the telescopes in Uccle, mainly at the Carte du Ciel, Double Astrograph and the Triplet, and plates taken by/for Uccle astronomers at foreign Observatories: ESO, Boyden, Rozhen, Haute Provence, etc. Their size is roughly between 10 and 30 cm, and covers between 2 and 8 degrees on the sky.

Thanks to the fact that plates were taken until the 1990s, there are still people at the Royal Observatory having worked with these plates and capable of handling these plates. Still, these plates are in danger. Storage conditions were far from optimal and on some plates the emulsion suffers from aging. Due to improper handling of them (sometimes by unqualified staff), some plates are broken, and even more damage has been brought to the scientific content by trying to “repair” broken plates.

Although these plates still contain valuable scientific content, these plates are difficult to access: each consultation of the plate requires a physical access to it, meaning that the interested astronomer must travel to the plate, and that the plate is exposed to risks. The only way to fully exploit these plates in an efficient and risk-free way is to digitise them and make the digital images available to the astronomical community.

## NATIONAL DIGITISATION PROJECTS

A first national digitisation project, D4A (Digital Access to Aerial and Astronomical photographic Archives) was started in 2002, in the context of a series of pilot digitisation projects initiated by the

Belgian Federal Science Policy. The aim of this project was to build a high-precision digitiser and demonstrate its quality. This project was a partnership between the National Geographic Institute, the Royal Museum of Central Africa, both possessing important collections of aerial photographs, and the Royal Observatory of Belgium, possessing the aforementioned collection of astrophotographic plates, and with AGFA-Gevaert, a world leader in photographic matters, as industrial partner and the Free University of Brussels (VUB) and the University of Antwerp as academic partners. A digital catalogue of the metadata was created from the notes that were available in the observing logs and on the plates envelopes. Meanwhile, flatbed scanners were used to make quick-look images of the plates and the historic measuring notes on their glass side.

A second national digitisation project, which we call “007” was started in 2006. It was in the context of a first series of operational digitisation projects initiated by the Belgian Federal Science Policy. In this project we made the high-precision digitiser Damian operational. The metadata catalogue was further completed as well as the set of quick-look images, and the plates were put in Tyvek envelopes and stored in the new archive. This project is a partnership between the Royal Institute for Cultural Heritage, possessing a very important collection of photographs of Belgian cultural heritage, the Royal Museum of Central Africa, and the Royal Observatory of Belgium.

We expect in 2012 mass digitisation of the collections of the Belgian Federal Scientific Institutes to start through a public-private partnership. The Uccle collections are intended to be included in this project, and Damian to be used for the digitisation. Digitised images should be made available either online or offline. It should be noted that also other collections than astrophotographic plates of the Royal Observatory (archives, library catalogues, etc.) will be included in this project.

## THE EQUIPMENT

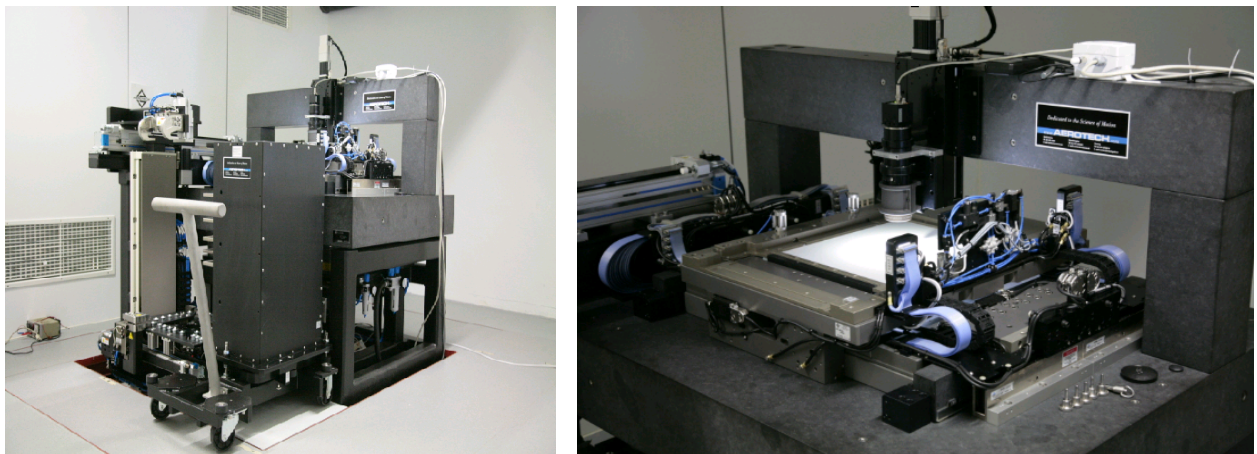


Figure 1. The Damian digitiser.

Damian is the high-precision digitiser built in the course of the two national digitising projects. It can digitise photographic plates up to  $35 \times 35$  cm, with a resolution of 7 micrometer. Positional accuracy is better than 100 nm and the repeatability is better than 10 nm. There is a turntable to digitise the same plate in different orientations, a plate tray exchange robot with plate tray magazine that can hold 31 plates that can be digitised unattended, and a film roll transport system allowing also to digitise a complete film roll unattended. For the highest photometric accuracy and speed an upgrade is still needed of the detector and the objective. A second base has been installed, such that there is room for a second digitiser.

An archive room has been installed next to the Damian digitiser with rolling shelves that can hold ~100 000 plates.

Both the archive room and the digitiser are climatised. The environment of the digitiser is stabilised at 20°C within 0.05°C and kept at 50% within 1% relative humidity.



Figure 2. The archive room and the shelves.

## **INTERNATIONAL PROJECT UDAPAC**

UDAPAC, the Uccle Data Astronomical Plate Archive Centre, was initiated in 2000. In this project, Uccle would serve as a host for photographic plates from other Observatories who have lost the know-how of handling such plates, who have no interest any more in their own collections, who have no money to properly store them or to make them available, or who are in lack of space to store them. This project was put on hold until the digitiser was ready and the archive room ready to store the plates. At present the procedure is on-going to move the ESO (European Southern Observatory) plate archive from Garching to Uccle.

For the moment there is no funding for digitising plates stored in Uccle through the UDAPAC project. Other European observatories are also in the need of funding for digitising their collections. A task group has been set up, involving people of the Royal Observatory to investigate the possibility to get funding for digitising European astronomical plate collections. However, there have been no calls yet in FP7 or PSP that would fund *en masse* digitisation of astronomical plates.