Software tools for digitization of astronomical photographic plates

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Outline

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Introduction

The basic source of data for the wide-field (larger or equal of 1 square degree) astronomical photographic plates obtained with professional telescopes world-wide is the Wide-Field Plate Database (WFPDB). It consists of four parts:

- Catalogue of plate archives (data for archives).
- Catalogue of plate indexes (meta-data for plates).
- Data bank of digitized plate images (previews and FITS).
- Links to on-line services and cross-correlation with other needed existing catalogues and journals.

FITS Header Software

The FITS header is an important part for processing of plates images. It contains meta-data for the plate. In parallel of scanning plates, we have to create the FITS header. The software uses the data stored in WFPDB.

- *Demonstration*

FITS Header Standard

- *Demonstration*

The abbreviations in the first column of the table mean:

- `fixed`: the value is fixed in case of plates
- `tif2fits`: the value will be placed by **tif2fits**
- `md`: the value is copied from **maindata** file
- `not`: the value is copied from the **notes** file
- `obser`: the value is copied from the **observers** file
- `cat`: the value is copied from the CWFPAs file
- `calc`: the value is obtained by calculation
- `man`: this value must be inserted manually

tif2fits

This software is designed for converting row-tif files, produced by VueScan, to FITS files. The input data for a plate consist of

- image file and
- header file.

In convert process the values in following fields are updated:

- DATE-SCN (the scan date and time),
- DATE (last change of file),
- NAXIS1 and NAXIS2 (image size).

In case of scanning with a wedge, the program separates wedge part of the image and produces two FITS files – one for the plate and one for the wedge.

tif2fits

- *Demonstration*

Experience

Telescope	scale (arcsec/mm)	plate size (cmxcm)	resolution (pdi)	file size (MB)
POT015	138	20x20	2400	681
POT080	17	16x16	1600	193
BAM010C	338	16x16	2400	430
BON030	138	16x16	2400	386
HAR025C	167	20x25	1600	430
ROZ050	120	16x16	2400	430
ROZ200	13	16x16	2400	430

Conclusions

The presented here software is a part of a technology (full pipe-line) for digitization of astronomical photographic plates. It speeds up the processing time and decreases the possibility of errors in FITS header. Separating image with wedge is a new feature in such type of software. Improvements may go in several directions:

- to conform the FITS header to requirements of new FITS standard 3.0 (2010);
- to include validation rules for some fields in header software, especially for coordinates, numerical values, etc.;
- to add the algorithm for calculating the coefficients for converting local plate coordinates to World Coordinate System.

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:(10k U 4 Ur attention! :)

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