Baltic Astronomy, vol. 6, 251–254, 1997.

DATABASE OF PHOTOGRAPHIC OBSERVATIONS OF CELESTIAL BODIES FROM THE GOLOSIIV OBSERVATORY

L. Pakulyak, N. Kharchenko, E. Yizhakevich, V. Golovnya, V. Andruk and V. Kislyuk

Main Astronomical Observatory, National Academy of Sciences of Ukraine, Golosiiv, Kiev 252650, Ukraine

Received July 20, 1996.

Abstract. The wide-field plate database of the Golosiiv Observatory is described.

Key words: databases – astrometry: photographic – plate archives

The Main Astronomical Observatory of the National Academy of Sciences of Ukraine, which is located in the Golosiiv district of Kiev (140 m above sea level), possesses a large collection of wide-field plates, consisting of more than 12 000 negatives obtained in 1950 to 1995. Most of them were taken with two instruments: the double long-focus astrograph (LFA) (D/F=400/5500, field 2×2 degrees) and the double wide-angle astrograph (WAA) (D/F=400/2000, field 8×8 degrees). This was done within the framework of several large observational projects, undertaken from the 1950s to the 1960s with a second epoch of observations from the 1970s to the 1990s.

Almost all of the LFA projects were proper motion surveys which constituted the photographic parts of the Faint Stars Catalogue project. They included areas with galaxies and fundamental stars, variable stars (long-period, semiregular and novae), and the special program areas with open and globular clusters as well as in the neighborhood of close and visual binaries and stellar associations. The time covered by the 5500 plates is 35 years (Tables 1 and 2). Some of the plates were taken with a hexagonal objective

diaphragm to separate close objects, and the others were taken with the objective grating. Almost all of them were taken with two or more exposures for the determination of the magnitude equation or for photometric purposes.

Table 1. The databank for astrometry and stellar astronomy.

Project, astrograph (1) – LFA, (2) – WAA)	No. of sky areas	No. of plates	Integrated time of exposure, h
1. Galaxies (1)	164	1097	1080
2. Fundamental stars (1)	402	1769	610
3. Variable stars (1)	211	788	275
4. Special program (1)	379	1812	460
5. Northern sky survey (2)	952	2207	700
6. Solar system bodies (1+2)	—	2400	—
7. Moon (1)	—	1000	—
8. Artificial satellites (2)	—	2000	—

Another important set of photographic observations is of the Solar system objects (major planets and their satellites, minor planets and comets), which were started in the 1950s with LFA. After the WAA was mounted in 1976, observations of the Solar system objects continued with two astrographs (Tables 1 and 2).

Table 2. The distribution of the plates by the year.

Project/Year	1950 1955	1956 1960	1961 1965	1966 1970	1971 1975	1976 1980	1981 1985	1986 1990	1991 1995
Galaxies	367	182	106	7	92	49	269	23	—
Fundamental stars	—	278	777	81	73	33	388	141	—
Variable stars	2	2	394	306	64	20	—	—	—
Special program	47	191	689	155	305	191	141	—	—
Northern sky survey	—	—	—	—	—	10	924	941	432
Major planets	—	132	169	295	301	337	199	261	55
Minor planets	156	88	60	55	80	424	345	303	—
Comets	—	—	—	—	84	251	210	—	—

The most active program of photographic observations of comets was carried out during the Halley comet appearance in early 1980s within the framework of the SOPROG project to support the VEGA and the GIOTTO space missions to the comet.

The plates of the Moon were obtained during the period from the 1950s to the 1980s with LFA to study the marginal zone of the Moon and, later on, to determine its accurate position and the absolute orientation of the selenodetic reference frame (Table 1).

Among the recent observational projects are observations of artificial Earth satellites, which started in the 1980s with WAA.

In 1981 regular observations within the framework of the photographic survey of the northern sky (FON) began with six WAAs at various observatories of the former Soviet Union to provide a fourfold sky coverage, selected with the catalog of positions and proper motions of 1 million stars of the AC list. By 1993, a single sky coverage was completed in Kiev and in 1992 regular measurements of plates were begun with the PARSEC automatic measuring machine, along with the simultaneous reduction of data.

Table 3 gives the actual limiting magnitude after the evaluations made on the basis of photoelectric standards of the MEGA project.

Table 3. Limiting stellar magnitudes.

Sort of emulsion, color band	Declination			Plates with gratings image order		No. of plates	
	−13 to 10 degrees	10 to 30 degrees	30 to 60 degrees	zero	first	all	used
Exposure time (in min)	60 and 5	60 and 5	60 and 5	20 and 20			
Agfa-Astro, *B*	15.8 13.6	15.5 13.6	15.7 13.3	14.7	10.9	2500	65
Ilford, *B*	— —	16.0 —	16.0 —	—	—	140	5
Kodak OaO, *B*	16.0 14.1	16.3 14.7	16.1 14.8	15.5	12.5	90	21
ORWO ZU-1,2, *B*	15.9 —	16.2 14.1	16.1 14.1	14.4	11.5	1630	26
ORWO ZU-21, *B*	15.6 14.0	15.7 14.4	16.0 14.2	14.8	11.6	740	45
ORWO NP-27, *V*	13.6 11.7	13.9 11.9	14.2 11.9	—	—	350	42
Exposure time	16–18 min and 0.7 min (FON project)						
ORWO ZU-21, *B*	14.1 11.9	14.1 11.9	14.1 11.9	—	—	2207	15

The plate archive database (with a total size of about 1.8 Mb) was created in the FOXBASE+environment to systematize the data. At present it consists of several independent basic files of identical structure and common data (number, center, date, etc.), in accordance with major observational projects, and some supplementary files with specific data and structure, depending on the data they contain. The database is operated through two user interfaces

with a flexible multi-level menu system for data maintenance and extraction. At present, we are correcting and testing our database, entering into it the information from some specific projects that are now underway. We plan to complete it this year.

ACKNOWLEDGMENT. This work is partially supported by a grant No. U4I000 from the International Science Foundation.