

# Ukrainian Virtual Observatory: Astroplates and the Joint Digitized Archive



<http://ukr-vo.org>



I.Vavilova (1), L.Pakuliak (1), Yu.Protsyuk (2), A.Shlyapnikov (3),  
V.Golovnya (1), O.Yizhakevych (1), S.Shatokhina (1),  
L.Kazantseva (4), N.Virun (5), S.Kashuba (6)

*1 Main Astronomical Observatory NAS of Ukraine, 2 Research Institute “Nikolaev Astronomical Observatory”, 3 Scientific Research Institute “Crimean Astronomical Observatory”, 4 T.Shevchenko Kyiv National University, 5 I.Franko Lviv National University 6 I.Mechnikov Odessa National University*

*“ASTROPLATES”, Prague, March 20, 2014*



# Outline of Report

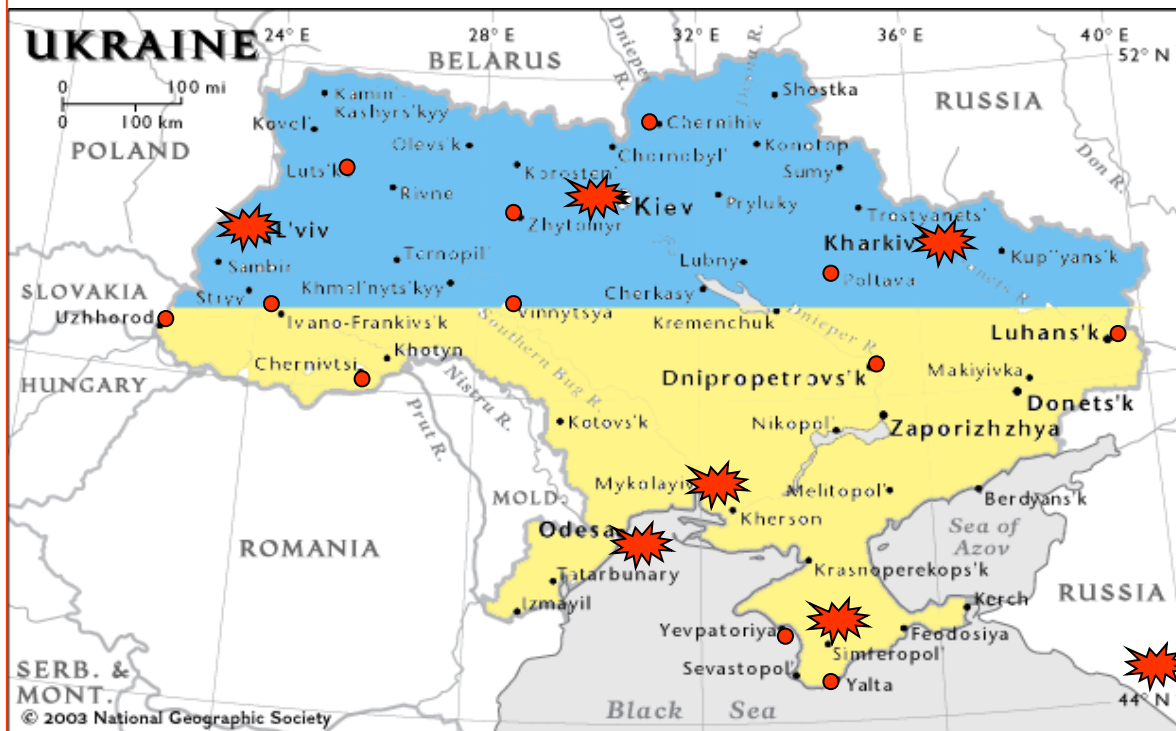
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- \* Introduction**
- \* UkrVO Joint Archive of Observations**
- \* Scientific Projects:**
  - UkrVO Joint Digitized Archive
  - New Stellar catalogues
  - Software for search of the new Solar System bodies



# Astronomical Institutions: UkrVO Regional Nodes

- Main Astronomical Observatory (Kyiv 1944)
- Crimean Astrophysical Observatory (Simeiz 1908; Naukove 1945)
- Institute of Radio Astronomy (Kharkiv 1950-ies)
- Mykolaiv Astronomical Observatory (1821)
- Astronomical Observatory Kyiv Nat. University (1845)
- Astronomical Observatory L'viv Nat. University
- Astronomical Observatory Odesa Nat. University (1871)
- Institute of Astronomy Kharkiv Nat. University
- ICAMER (p. Terskol, North Caucasus, RF, 1970-ies)
- Space research Laboratory Uzhgorod Nat. Univ., 1957



Before 2009: 10 Local VO DBs including more 100 subLocal DBs in dependence on the past and current Res. Programs, Instruments, Software etc. (non-interoperability, wide heterogeneity)



## Joint Archive (2009-2014: monitoring, systematization etc.)

	Number Glass Plates (GP) CCD	Years	Sci. Programs	Catalogued & Hard& Soft	Others
<b>MAO NAS of Ukraine</b>	~85,000 GP  ~16,000 CCD ~1440 GP spec	1949-1992  2001-2003 1976-1990	Galaxies, QSOs, FON, stars, open clusters, Sol.Sys. small bodies  Stellar fields (ICRF) Active Sun	<b>C, H, S</b>	~26,500 direct images; mpg= 11 - 16 ; 9,800 digitized & 6000 preview
<b>Mykolaiv AO</b>	200 GP 8,405 GP 70,000 CCD	1929-1931; 1961- 1999 1996-2012	Star clusters, Zodiac stars, asteroids, comets	<b>C, H, S</b>	8000 digitized & preview
<b>Crimean AO</b>	~30,000 GP ~100,000 CCD Spec	1938-till now	Galaxies, stars, comets, asteroids, gaseous nebula	<b>C, S</b>	«dBASE III+» format mpg= 16 - 18 ; mv= 12-14 ;
<b>Kyiv AO</b>	200 GP > 20,000	<b>1895-1916</b> 1945-1996	N1916, Moon, stars Fundamental stars, open clusters, QSOs		4,500 systematized; Old collection (before 1916) digitized
<b>L'viv AO</b>	160 GP ~ 8, 000	1939-1976 <b>(160 were taken in 1939-1945)</b>	Comets, Asteroids, Variable stars, N	<b>C, S</b>	~6,000 direct images, in WFPDB `3,100 digitized
<b>Odesa AO</b>	<b>~ 10,000</b>  ~ 10,000 <b>~ 84,000</b>	<b>1909-1954</b> <b>Simeiz collection</b> 1945-1956 <b>1957-1998</b>	Variable stars, Comets, Asteroids, EASs. quasars		80% direct images (del: -15 +90 alfa: all) <b>Photometr.homogen.</b> 400 digitized

***Our goal – to originate and develop the Virtual Observatory of Ukraine at the basis of the common unified astroinformation resources of the astronomical institutions of Ukraine in the IVOA standards.***

***The UkrVO' development allows us***

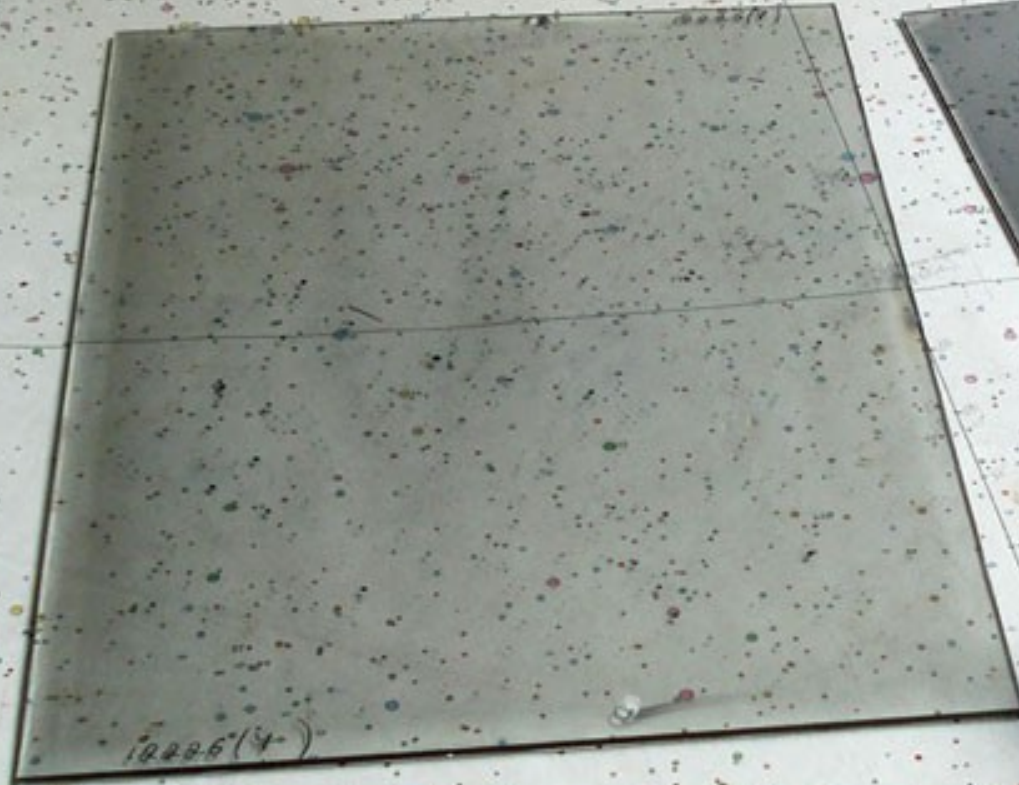
- to save the unique astronomical observational heritage accumulated in observatories of Ukraine from the 1890-ies***
- to open the wide on-line access to the joint database of digitized astronomic negatives and spectra for the national/foreign scientific community***



## **Main Tasks**


- Joint Digitized Archive (both Photogr. & CCDs)***
- Spectral Archives*** (by instruments, by objects, from decameter radio to gamma e.m.w. ranges)
  - Catalogues of celestial bodies***
  - IT-resources and VO-instruments***
  - Science with VO***





Sci. #1

UkrVO Joint Digitized Archive



The main task of the UkrVO project is the processing and digitizing the all astroplate's archives of astronomical observations, which were saved at the observatories of Ukraine since 1890s [1-6]. At the initial stage, this task involves the creation and development of the Joint Digital Archive (JDA) of photographic observations. The total number of photographic plates in the UkrVO collection exceeds 300 thousands, including not only the positional but also the spectral and photometric observations. The JDA pilot version includes only positional observations (<http://ukrvo.org/science/index.php?b1&2>).

Till the March of 2014, the JDA database contains more than 38 thousands records and more than 6 thousands of the digitized images from glass collections of Main Astronomical Observatory NAS of Ukraine (MAO NASU), Crimean Astrophysical Observatory (CrAO), Nikolaev Astronomical Observatory (RI NAO), and astronomical observatories of the national universities in Kyiv (AO KNU), L'viv (AO LNU), and Odesa (AO ONU). Among them are the following (see, also, Table 1):

# UkrVO Joint Digitized Archive of Astroplates

Now the UkrVO JDA consists of the observational databases of 6 observatories of Ukraine. The number of the digitized archives, astroplates, digitized images etc. are presented in Table 1 (till the end of 2013).

Table 1. Statistical data on the quantitative and qualitative status of the UkrVO Joint Digitized Archive


Observatory	Archives	Number of archives	Number of astro-plates in the main database	Number of astroplates in the processing	Total number of astroplates	Number of the digitized astroplates : Preview and full scans
MAO NASU	ABA020, ABA039B, BYU053, BYU100, EAO035, EAO040B, GUA010A, GUA010B, GUA011A, GUA011B, GUA012A, GUA012B, GUA015, GUA040A, GUA040B, GUA040C, GUA040D, GUA040E, GUA070A, GUA070B, GUA070C, MAJ060, QUI021A, QUI021B, TAS040A, TAS040B, TER060	27	26437	36	26473	7554 +2293
RI “Nikolaev AO”	MYK012, PUL012	2	8405	0	8405	-
**SRI “Crimean AO”	CRI012S, CRI017A, CRI017B, CRI040A, CRI040B, CRI040C, CRI100, CRI120, CRI260	D - 2 S - 6	11000 15000	1750 480		2100 730
AO KNU	9909900A, ABA020C, ABA020D, ABA039K, AMR020A, DAR020A, IND013S, KAO000A, KAO000B, KAO000C, KAO000D, KAO000G, KAO000P, KAO010A, KAO010B, KAO012A, KAO013, KAO013S, KAO014A, KAO020A, KAO040K, KAO040Z, KAO048A, KAO060A, KAO070A	25	589	958	1547	~1500*
AO LNU	LAO010	1	4090	37	4127	3073*
AO ONU	CRI012A, CRI012B	2	600	0	600	289 +216
	Total**(without CrAO data)	57	40121	1031	41152	14889

\* Digitized images are partially included into the UkrVO JDA

\*\* By the information from the CrAO VO (D – direct images, S – spectral plates) – now in 2014 these archives are in processing to be added to the UkrVO JDA





- 
- 26 000 records of astronegatives' metadata and more than 6000 digital images of MAO NASU glass collection (GPA);
  - 4 000 records of plates' metadata and more than 3000 digital images (from 4 000 digitized ones) of AO LNU glass collection;
  - 8400 records of plates' metadata of RI NAO glass collection (without images, which are available on the UkrVO web site, the database obtained by the mutual exchange of information between MAO NASU and RI NAO);
  - metadata of 24 partially filled observational archives of AO KNU glass collection with digitized images of more than 1 500 individual plates selected for the solution of current scientific problems;
  - 600 records and more than 400 digitized images of selected plates of AO ONU glass collection (out of 120 thousand plates), which are related to the Simeiz collection (CrAO) on the Solar System Small Bodies observations in the 1950s;
  - as well as the JDA of the Crimean AO.


- 
- A preliminary processing of the digitized images of the observational archives was done with MIDAS/ROMAFOT: registration of objects till 16m, determination of pixel coordinates, instrumental photometric evaluation [3, 4]. The final digitized scans are kept on a server for their following including to the UkrVO JDA (Fig. 1). We give in the Table 2 those statistical data about 125,000 astroplates (Ukrainian Plate Archives), which were included in the Wide-Field Plate Database [7, 8]. One can see a significant difference (see Table 1), which is connected, from our point of view, with a gap in the monitoring during the last years among the observatories on the current status of the digitized astroplates. For example, now the UkrVO JDA give access to the 50,000 digitized astroplates of a good quality.

Table 2. Ukrainian Plate Archives and telescopes, which are presented in the WFP Database [7, 8] till 2013.

WFPDB Identifier	Archive Location	Observatory	Telescope		Focal Length (m)	Scale ("/m)	Field Size, (deg)	Years of Operation	Direct Plates
			Type	Aperture /mirror (m)					
ABA020	Kyiv	Abastumani, Kanobili	Ast	2x 0,20	1,00	206	13,7	1990-1990	30
ABA039	Kyiv	Abastumani, Kanobili	Sch	0,39/0,44	0,62	330	8,2	1987-1987	20
BYU053	Kyiv	Byurakan Obs.	Sch	0,53/0,53	1,83	113	5,0	1985-1985	28
BYU102	Kyiv	Byurakan Obs.	Sch	1,02/1,31	2,13	97	4,0	1983-1983	15
CRI012	Odessa	Crimean Obs. Simeiz	Ast	2x 0,12	0,25	352	35,0	1909-1953	6900
CRI017A	Crimea	Crimean Obs. Simeiz	Cam	0,17	0,75	276	13,0	1948-1965	516
CRI017B	Crimea	Crimean, Nauchny	Cam	0,17	0,75	276	13,0	1951-1953	49
CRI040A	Crimea	Crimean Obs. Simeiz	Ast	0,40	1,60	129	10,0	1947-1948	59
CRI040B	Crimea	Crimean, Nauchny	Ast	2x 0,40	1,60	129	10,0	1951-1965	215
CRI040C	Crimea	Crimean, Nauchny	Ast	2x 0,40	1,60	129	10,0	1963-1998	9781
EAO040B	Kyiv	Engelhardt, Zelench,	Ast	0,40	2,00	103	8,9	1982-1993	142
GUA010A	Kyiv	Main Astron. Obs.	Ast	0,10	0,50	412	20,0	1957-1961	438
GUA010B	Kyiv	Main Astron. Obs.	Ast	0,10	0,50	412	20,0	1957-1961	277
GUA011A	Kyiv	Main Astron. Obs.	Ast	0,11	1,20	172	8,0	1955-1957	35
GUA011B	Kyiv	Main Astron. Obs.	Ast	0,11	1,20	172	8,0	1955-1957	55
GUA012A	Kyiv	Main Astron. Obs.	Ast	2x 0,12	0,70	295	20,0	1949-1990	2041
GUA012B	Kyiv	Main Astron. Obs.	Ast	2x 0,12	0,70	295	20,0	1949-1978	2143
GUA015	Kyiv	Main Astron. Obs.	Ast	0,15	1,70	121	6,0	1955-1961	162
GUA040A	Kyiv	Main Astron. Obs.	Ast	2x 0,40	5,50	38	2,5	1949-1986	8485
GUA040B	Kyiv	Main Astron. Obs.	Ast	2x 0,40	5,50	38	2,5	1949-1986	649
GUA040C	Kyiv	Main Astron. Obs.	Ast	2x 0,40	2,00	103	8,5	1976-1998	4276
GUA040D	Kyiv	Main Astron. Obs.	Ast	2x 0,40	2,00	103	8,5	1976-1997	1834
GUA040E	Kyiv	Main Astron. Obs.	Ast	2x 0,40	2,00	103	6,5	1981-2005	3657
GUA070	Kyiv	Main Astron. Obs.	Rfl	/0,70	3,15	66	1,0	1960-1973	566

KYI020	Kyiv	Kyiv University Obs.	Ast	0,20	4,30			1898-2004	2401
LAO010	L'viv	L'viv University Obs.	Ast	0,10	0,50	412	19,0	1939-1976	8339
MYK012	Mykolayiv	Mykolayiv Obs.	Ast	0,12	2,04	101	5,0	1961-1999	8500
ODE006A	Odessa	Odessa Obs.	Ast	0,06	0,12		30,0	1945-1957	2000
ODE006B	Odessa	Odessa Obs.	Ast	0,06	0,12		30,0	1945-1957	2000
ODE007	Odessa	Odessa Obs.	Ast	0,07	0,30		30,0	1945-1957	2000
ODE010A	Odessa	Odessa Obs.	Ast	0,10	0,50		22,0	1945-1957	2000
ODE010B	Odessa	Odessa Obs.	Ast	0,10	0,50		22,0	1945-1957	2000
ODE010C	Odessa	Odessa Obs.	Cam	0,10	0,25	288	35,0	1957-1990	7100
ODE010D	Odessa	Odessa Obs.	Cam	0,10	0,25	288	34,0	1957-1990	7100
ODE010E	Odessa	Odessa Obs.	Cam	0,10	0,25	288	25,0	1957-1990	7100
ODE010F	Odessa	Odessa Obs.	Cam	0,10	0,25	288	12,0	1957-1990	7100
ODE010G	Odessa	Odessa Obs.	Cam	0,10	0,25	288	12,0	1957-1990	7100
ODE010H	Odessa	Odessa Obs.	Cam	0,10	0,25	288	22,0	1957-1990	7100
ODE010I	Odessa	Odessa Obs.	Cam	0,10	0,25	288	18,0	1957-1990	7100
ODE015	Odessa	Odessa Obs.	Ast	0,15	1,00	204	12,0	1945-1957	2000
ODE020	Odessa	Odessa Obs.	Sch	0,20/0,40		474	6,0	1969-1980	2000
PUL012	Mykolayiv	Pulkovo Obs.	Ast	0,12	2,04	101	5,0	1929-1931	196
QUI021A	Kyiv	Quito Astron. Obs.	Cam	0,21	0,74	281	15,6	1986-1986	100
QUI021B	Kyiv	Quito Comet Station	Cam	0,21	0,74	281	15,6	1986-1986	50
TAS040A	Kyiv	Tashkent Obs. Kitab	Ast	2x 0,40	3,00	69	5,5	1981-1989	96
TAS040B	Kyiv	Tashkent Obs. Kitab.	Ast	2x 0,40	3,00	69	5,5	1981-1989	5

# Golosiiv Plate Archive interface

http://194.44.35.19/vol-mao/DB/data\_search.php

## DATABASE of GOLOSIIV PLATE ARCHIVE (DBGPA V2.0)

OUTPUT PREFERENCES SEARCH PLATES: FIELD OVERLAP OBJECTS BY ID# OR NUMBERS GUIDES SPECIALS V1.0

справки | сканер | журналы наблюдений

You've inquired:  
RA = 13<sup>h</sup> 31<sup>m</sup> 35<sup>s</sup> DEC = 35° 11'  
Area round dimensions: radius = 4 deg. of arc  
In the archive: everyone  
Dates: \*  
Exposition: every color: every  
Search plates: all  
[Back to OVERLAP Form with the same parameters](#)

Images	GUA ID	RA hhmmss	DEC ddmmss	Date	Expos. min	Dimensions cm	Instrum.	Place of
	GUA040A002695	12 39 29	+34 13 55	6304	X 586	Y 549		
	GUA040A002651	12 39 30	+34 13 53	6303				
	GUA040A002650	12 39 30	+34 13 53	6303				
	GUA040A001983	12 39 35	+34 13 16	6104				
	GUA040A004417	12 47 19	+30 23 37	6003				
	GUA040C001420	12 47 25	+32 08 38	8902				
	GUA040C002295	12 47 42	+36 13 38	9304				
	GUA040C001225A	12 47 42	+36 10 38	8804				
	GUA040C002202		+36 04 38	9304				
	<a href="#">Scans available on e-mail demand:</a>				+39 09 22	8209		
	grey 16 bit 1200 dpi TIFF/FITS 400Mb			+38 45 15	7904			
	grey 16 bit 1200 dpi			+38 45 15	7904			
	(90 CW rotated) TIFF/FITS 400Mb			+37 54 14	8504			
				+31 10 39	9510			
				+30 58 39	9510			
	GUA040C00201A	12 55 12	+31 18 39	9510				
	GUA040C00205A	12 55 12	+30 58 39	9510				
	GUA040C00204B	12 55 12	+30 58 39	9510				

Click to close

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
























# Golosiiv Plate Archive interface

**DATABASE of JOINT PLATE ARCHIVE (DBGPA V2.0)**

PREFERENCES SEARCH PLATES: FIELD OVERLAP OBJECTS BY IDs OR NUMBERS GUIDES SPECIALS V1.0

Pages: 1 | 2 | 3 |

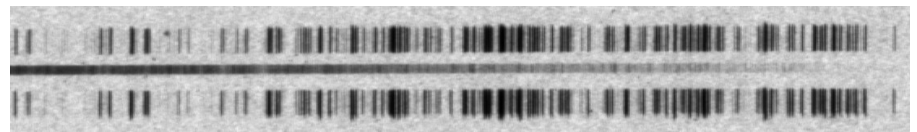
Locate plate Log No  FindIt!

No	UID	GUA ID	RA	DEC	Date	Exp	Emulsion	color	object	avail	images
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2	39069	CRI012A010757	7 40 0	+ 14 0 0	520217	45	KodakU103aE	Pg		-	 
3	39071	CRI012A010759	9 25 0	+ 17 0 0	520221	45	KodakU103aE	Pg		-	 
4	39073	CRI012A010761	11 40 0	+ 7 0 0	520222	45	KodakU103aE	Pg		-	 
5	39075	CRI012A010763	10 10 0	+ 22 0 0	520227	45	KodakU103aE	Pg		-	 
6	39077	CRI012A010765	11 30 0	+ 10 0 0	520227	45	KodakU103aE	Pg		-	 
7	39079	CRI012A010767	10 40 0	+ 15 0 0	520229	45	KodakU103aE	Pg		-	 
8	39081	CRI012A010769	10 8 0	+ 9 0 0	520324	45	KodakU103aE	Pg		-	 
9	39083	CRI012A010771	10 26 0	+ 17 0 0	520324	45	KodakU103aE	Pg		-	 
10	39085	CRI012A010773	14 5 0	0 0 0	520324	45	KodakU103aE	Pg		-	 
11	39087	CRI012A010775	11 50 0	+ 17 0 0	520415	45	KodakU103aE	Pg		-	 
12	39089	CRI012A010777	12 40 0	+ 8 0 0	520415	45	KodakU103aE	Pg		-	 
13	39091	CRI012A010779	12 32 0	- 17 0 0	520416	45	KodakU103aE	Pg		-	 
14	39093	CRI012A010781	13 45 0	- 10 0 0	520416	45	KodakU103aE	Pg		-	 
15	39095	CRI012A010783	12 25 0	+ 11 0 0	520417	45	KodakU103aE	Pg		-	 
16	39097	CRI012A010785	13 15 0	+ 4 0 0	520417	45	KodakU103aE	Pg		-	 
17	39099	CRI012A010787	14 58 0	- 19 0 0	520417	45	KodakU103aE	Pg		-	 

metadata

preview

First spectra images



Україна

RA and Dec (h m d m OR d d): 1 2 -1 2

Sizes of search region (RA, Dec), deg: 12.3

Period of observations (YYYY MM DD): from 1929.01.01 to 2011.01.01

Observations with: ☒ photo plates ☒ CCD

## Observational campaigns with photo plates

- |   |   |  |
|---|---|--|
| <input checked="" type="checkbox"/> Stars: 1252 plates                  | <input checked="" type="checkbox"/> Stars around Radio Source: 485 plates | <input checked="" type="checkbox"/> Stellar Cluster: 2350 plates   |
| <input checked="" type="checkbox"/> Double or Multiple Star: 987 plates | <input checked="" type="checkbox"/> Variable Star: 1842 plates            | <input checked="" type="checkbox"/> Nebula: 48 plates              |
| <input checked="" type="checkbox"/> Supernova (remnant): 18 plates      | <input checked="" type="checkbox"/> Fundamental Star: 2105 plates         | <input checked="" type="checkbox"/> Association of Stars: 4 plates |
| <input checked="" type="checkbox"/> Stars around the Pole: 276 plates   | <input checked="" type="checkbox"/> Zodiac Stars: 1127 plates             | <input checked="" type="checkbox"/> Equatorial stars: 489 plates   |
| <input checked="" type="checkbox"/> Planet: 4261 plates                 | <input checked="" type="checkbox"/> Moon: 854 plates                      | <input checked="" type="checkbox"/> Asteroid: 4527 plates          |
| <input checked="" type="checkbox"/> Comet: 1603 plates                  | <input checked="" type="checkbox"/> Artificial Satellite: 4156 plates     | <input checked="" type="checkbox"/> Field: 5925 plates             |
| <input checked="" type="checkbox"/> Radio Source: 211 plates            | <input checked="" type="checkbox"/> Undefined object: 52 plates           | <input checked="" type="checkbox"/> Galaxy: 1320 plates            |
| <input checked="" type="checkbox"/> Quasi-Stellar Object: 162 plates    | <input checked="" type="checkbox"/> Group of Galaxies: 139 plates         | <input checked="" type="checkbox"/> Cluster of Galaxies: 5 plates  |

Check all 34198 plates

Uncheck all plates

Optional parameters of photo plates

Optional telescopes for photo plates

Observational campaigns with CCD

Optional parameters of CCD frames

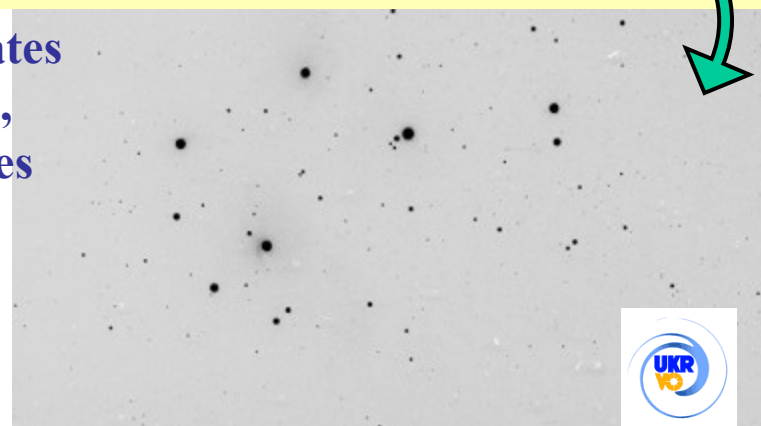
Optional telescopes for CCD observations

Login, password

Search

s	Dec, d:m	Y/M/D	Object	Link
35	+02:47	1955/09/20	Field	-
38	-01:24	1988/09/18	Mars, Deimos, Fobos	-
38	-01:24	1988/09/18	Mars	-
18	+04:05	1988/12/10	Mars	-
30	+01:13	1967/10/04	Saturn	<a href="#">preview</a>
33	-01:19	1988/09/17	Mars, Deimos, Fobos	-
42	+01:15	1967/10/03	Saturn	<a href="#">preview</a>
42	+01:15	1967/10/03	Saturn	<a href="#">preview</a>
01	-06:53	1979/12/14	(1) Ceres	-
01	-06:53	1979/12/14	(1) Ceres	-
04	-01:12	1988/09/21	Mars	-
33	+02:39	1963/11/27	Jupiter	-
33	+02:39	1963/11/27	Jupiter	-
57	+02:40	1963/11/24	Jupiter	-
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00	+02:00	1990/08/29	Equatorial catalog	-
00	-02:00	1990/09/24	Equatorial catalog	-
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29	-03:50	1980/09/05	(40) Harmonia	-
29	-03:50	1980/09/05	(40) Harmonia	-
48	-00:51	1988/08/07	Mars	-
00	+02:45	1963/11/15	Jupiter	<a href="#">preview</a>
00	+02:45	1963/11/15	Jupiter	<a href="#">preview</a>
29	-01:52	1988/09/16	Field	-
26	-00:20	1996/11/09	Juno	<a href="#">preview</a>
38	-01:08	1957/11/22	4 Vesta	-
44	-01:08	1957/11/21	4 Vesta	-

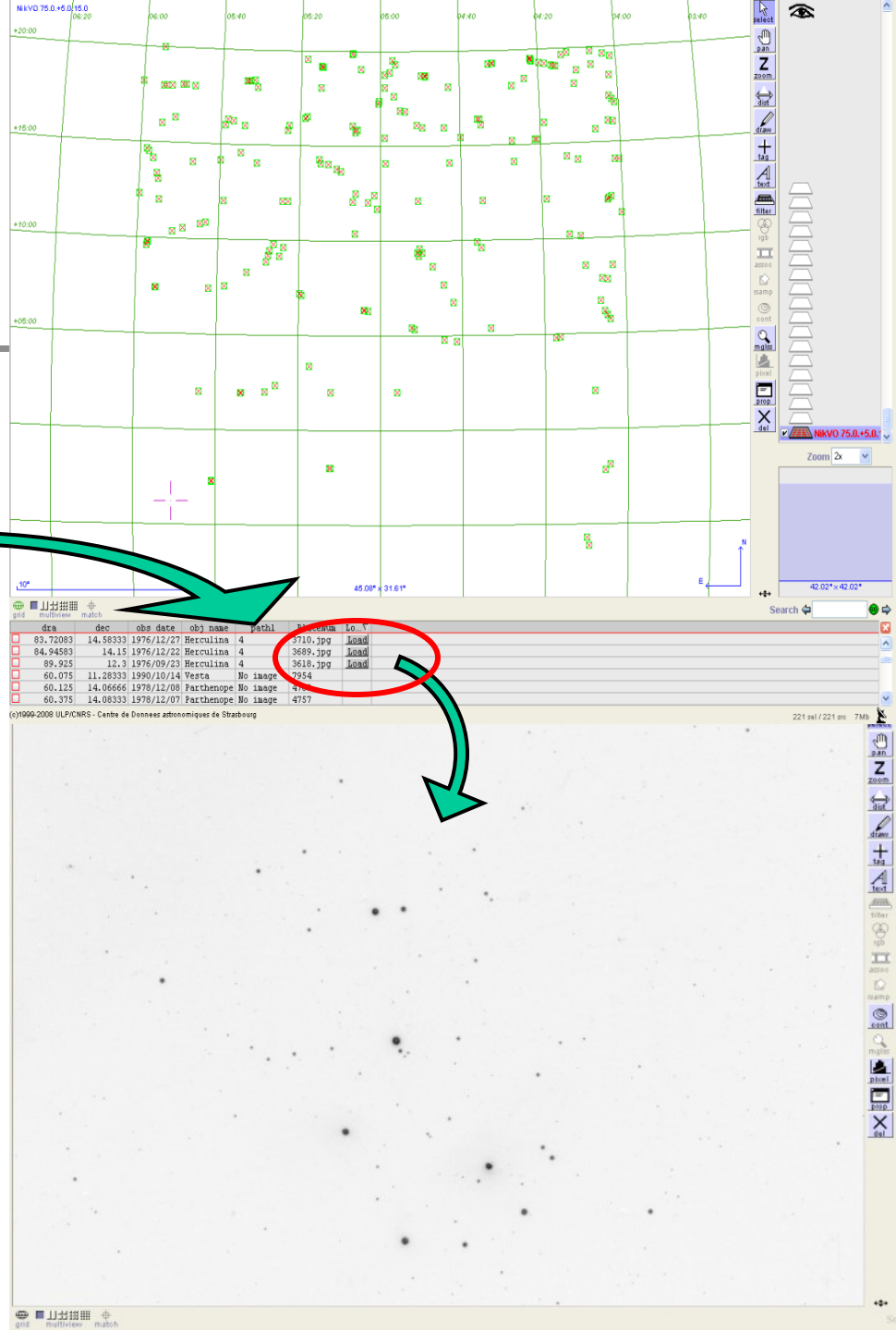
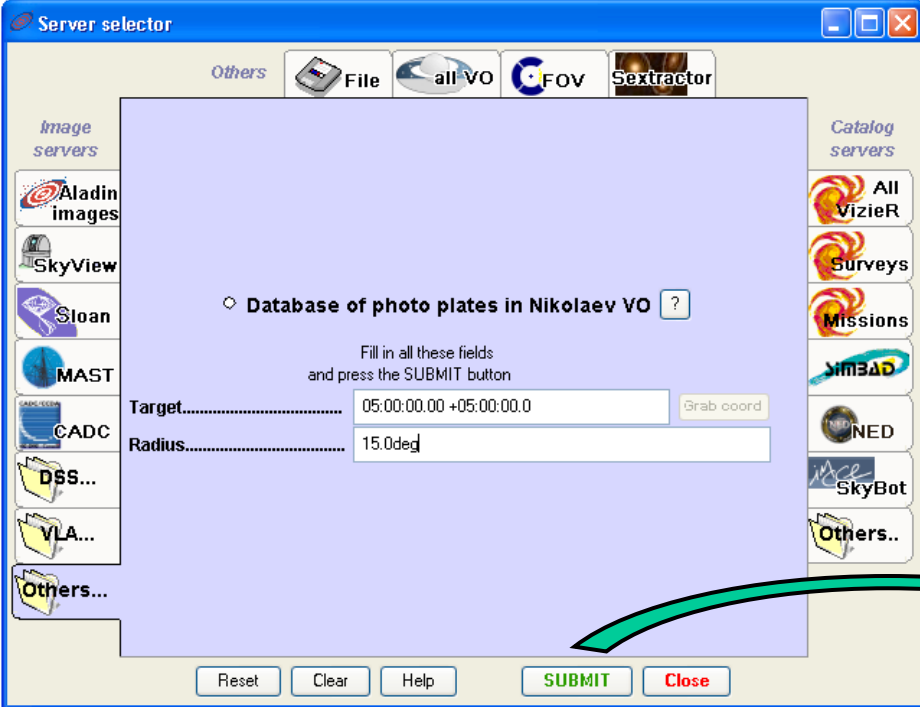
Number of found plates in the table: 299



Database provides an opportunity to search plates and/or CCD frames by using equatorial coordinates, radius of search region, period of observations, names and types of objects, names of telescopes.

Access to the preview images is shown.

Database includes about 34,000 plates and 70,000 CCD frames.



Databases of plates and CCD frames are available via Aladin interface. The same databases are used via browser and Aladin.

Visualisation process of search for plates is shown.





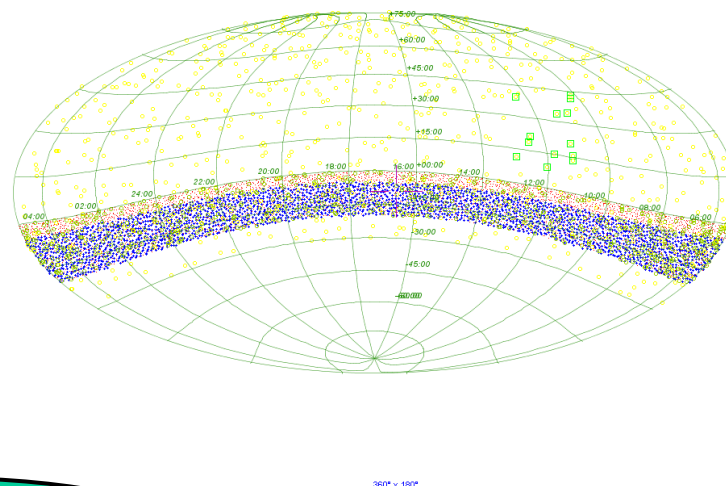
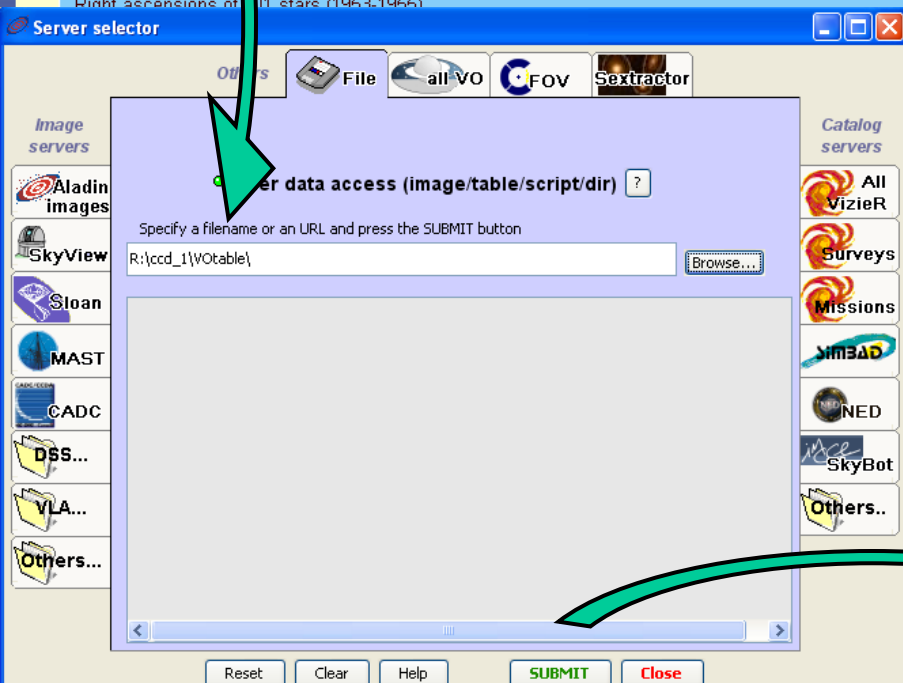
# Ukrainian Virtual Observatory

Українська

Stellar catalogues in VOTable format:

Catalogue of 1720 stars (1832-1834)	▼
Catalogue of 5954 stars (1876-1899) <b>CDS, Strasbourg</b>	▼
Absolute declinations of 172 stars at mean epoch of 1925.0	▼
Absolute declinations of 707 stars (1929-1939)	▼
Absolute declinations of 587 stars (1939-1941, 1945-1951)	▼
Absolute declinations of 710 stars (1957-1964)	▲
Visual observations in the declination range +90° to -30° were carried out with the Repsold vertical circle. 187 stars were observed in both culminations. Systematic instrumental errors were taken into account during the reduction process.	
<b>VOTable</b>	
Absolute right ascensions of 674 stars included in the FK3 (1929-1935)	▼
Absolute right ascensions of 571 stars included in the FK3 (1939-1941, 1945-1950)	▼
Absolute right ascensions of 626 stars (1959-1963)	▼
Absolute right ascensions of 431 stars (1973-1975)	▼
Right ascensions of 54 stars included in the FK3 (1947-1952)	▼
Right ascensions of 11 stars (1953-1955)	▼

27 astrometric stellar catalogues with short descriptions in VOTable format are available for downloading from the web site. One can visualize and use any catalogue via Aladin or any other stand alone application.



ra	dec	mag	sp	RA	SparPA	RA	epoch	numObs	diffFK3	numFK3	starNum
176.37248325	+14.963333	2.23	A2	-0.0343		1930	F113	-	444	332	
180.3897291	+9.121666	4.24	G5	-0.0149		1932.01	15	-	450	336	
185.60078745	+39.406666			-0.007		1932.07	17	-	461	344	
186.55118745	+21.283333	5.72	A2	-0.007		1932.15	17	-	466	345	
187.90459575	+18.761666	5.13	K0	+3.0105	-0.006	-0.0004	1932.11	17	-	473	351
194.67286245	+11.335	2.95	K0	+3.0051	-0.0005	-0.0186	1931.87	30	-	488	360







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tel: +380 44 526 3110  
fax: +380 44 526 2147  
mail: support@ukr-vo.org

# JOINT DIGITAL ARCHIVE prototype

## OBSERVATIONAL ARCHIVES OF JDA PROTOTYPE

WFDB Instrument Identifier	Original Name(Abbrev) of the Instrument/Type	Location of the Archive (Astronomer in Charge)	Observatory	Marsden's No./ Arch.Type/ Neg.Type	Time Zone	East Long./ Latitude/ Altitude (m)	Clear Aperture/ [Mirror Diameter (m)]	Focal Length(m)/ [Scale ("/mm)]/ Field Size [deg]	Years of Oper.	Number of Direct Plates
KAO020A	DANR [Ast]	Kyiv, Ukraine [Kazantseva L.V.]	Observatory of Kyiv Shevchenko National University Kyiv Ukraine	085 comp.readable glass	2	30 30 50 27.2 186	20	4.26 [48] 1.7	1946-1999	1000
KAO070A	AZT8 [Rfl]	Kyiv, Ukraine [L. Kazantseva]	Astronomical Observatory, Kyiv Shevchenko National University Lysnyky Ukraine	585 printed tab. glass	2	30 31 50 17.9 156	0 [0.7]	2.8 [90.7] 0.2	1999	
LAO010	Zeiss 50/10 [Ast]	Lviv, Ukraine [N.Virun]	Astron.Observ.Lviv Nat.University Lviv Ukraine	067 printed tab. glass	3	23 57 49 55 359	10	0.5 [412] 1	1939-1976	8500
MAJ060	Zeiss-600 [Rfl]	Kyiv Ukraine [V.Golovnya]	Majdanak Obs. Kyiv Station Uzbekistan	188 comp.readable glass	5	66 52.8 38 41 2600	0.6 [0.6]	7.5 [28] 0.5	1986-1991	544
MYK012	ZZA [Ast]	Mykolayiv,Ukraine [G. Pinigim]	Mykolayiv Ast. Obs., Mykolayiv Ukraine	089 comp.readable glass	2	31 58.5 46 58.3 83	12	2.04 [101] 5	1951-1999	8209
PUL012	ZZA [Ast]	Mykolayiv,Ukraine [G. Pinigim]	Main Astr.Observatory Pulkovo Russia	084 comp.readable glass	3	30 19.6 59 56.3 75	12	2.04 [101] 5	1929-1931	196
QUI021A	CA [Cam]	Kyiv Ukraine [V.Golovnya]	Quito Astron. Obs. Quito Ecuador	781 comp.readable film	-4	-78 29.3 0 12.6 2860	0.210	0.74 [281] 10.6	1986-1986	66

http://194.44.35.19/vo-mao/DB/data\_search.php

(DBGPA V2.0)

OUTPUT PREFERENCES SEARCH PLATES: FIELD OVERLAP OBJECTS BY IDs OR NUMBERS GUIDES SPECIALS V1.0

You've inquired:  
RA = 50h m s DEC = 24° ' "  
Area round dimensions: radius = 5 deg. of arc  
In the archive: everyone  
Dates: -  
Exposition: every color: every  
Search plates: all  
Back to OVERLAP Form with the same parameters

images	GUA ID	RA hhmmss	DEC ddmmss	Date	Expos. min	Dimensions cm	Instrum.	Place of Storage
	GUA012A000310A	00 00 00	+19 00 00	530522	3	18x24	DSA	The plate is not available
	GUA012B0000026	00 00 00	+26 00 00	490824	5	18x24	DSA	The plate is not available
	GUA012B000310A	00 00 00	+19 00 00	530522	3	18x24	DSA	The plate is not available
	GUA012B0000049	00 00 00	+26 00 00	490830	2.5	13x18	DSA	sh.220 box26
	GUA040C001511A	00 00 04	+28 02 42	891019	0.5	30x30	DWA	sh.314 box33
	GUA040A002508	00 11 37	+22 29 25	621013	20	24x24	DLA	sh.346 box42
	ABA039B027758	00 17 00	+25 30 00	880108	6	9x9	SCHC	sh.354 box11
	MYK012 005462	00 19 30	+28 22 00	800904	5	24x24	ZZA	Available in Mykolayiv Astronomical Observatory Ukraine.
	MYK012 005458	00 20 00	+28 32 00	800904	5	24x24	ZZA	Available in Mykolayiv Astronomical Observatory Ukraine.
	ABA039B027764	00 23 45	+26 25 07	880109	6	9x9	SCHC	sh.354 box11
	ABA039B027765	00 23 47	+26 20 57	880109	6	9x9	SCHC	sh.354 box11
	GUA040C001514B	00 03 39	+27 51 08	890923	0.7	30x30	DWA	sh.301 box12
	LAO010 003567	00 05 00	+28 35 00	561001	50	13x18	Zeiss50/10	Available in the AO of Franko university, Lviv, Ukraine
	ABA039B029807	00 05 00	+28 00 00	900602	6	9x9	SCHC	sh.354 box11
	GUA040E000457	00 05 15	+23 15 57	820301	6	24x24	DWA(C)+ASC	The plate is not available
	GUA040D001775	00 05 30	+27 57 30	890718	5	30x30	DWA	sh.10 box29

http://212.111.210.10/UkrVO/DB/vo3\_results.php

Centre of search region (RA, Dec): 50.00°, 24.00°  
Size of search region (RA, Dec): 5°, 5°  
Time period of observations (Y/M/D): from 1929/01/01 to 2011/01/01

Number of plates in the database: 34198

Plate	RA, h:m:s	Dec, d:m	Y/M/D	Object	Link
GUA040C 001730A	03:12:02	+24:05	1990/10/13	Northern sky survey	-
MYK012 004179	03:14:54	+24:11	1977/10/11	Zodiac catalog - A	-
MYK012 005529	03:22:54	+22:11	1980/10/17	Zodiac catalog - B	-
GUA012B 000276	03:22:57	+24:10	1951/10/28	The Pleiades	-
GUA012B 001282	03:22:57	+24:10	1959/11/28	The Pleiades	-
GUA012A 000276	03:22:57	+24:10	1951/10/28	The Pleiades	-
MYK012 005617	03:23:00	+26:11	1981/01/04	Zodiac catalog - B	-
GUA040A 000902B	03:27:37	+21:40	1972/03/29	Venus	-
GUA040A 000903B	03:27:37	+21:40	1972/03/29	Venus	-
GUA040C 001887	03:27:43	+21:58	1991/10/12	Northern sky survey	-
GUA040C 001724A	03:27:51	+24:06	1990/10/11	Northern sky survey	-
MYK012 000302	03:28:00	+21:41	1979/03/29	Venus	-

Number of found plates in the table: 13

Elapsed time: 0 s

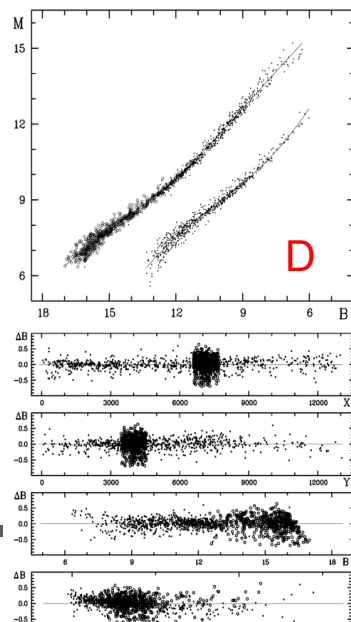
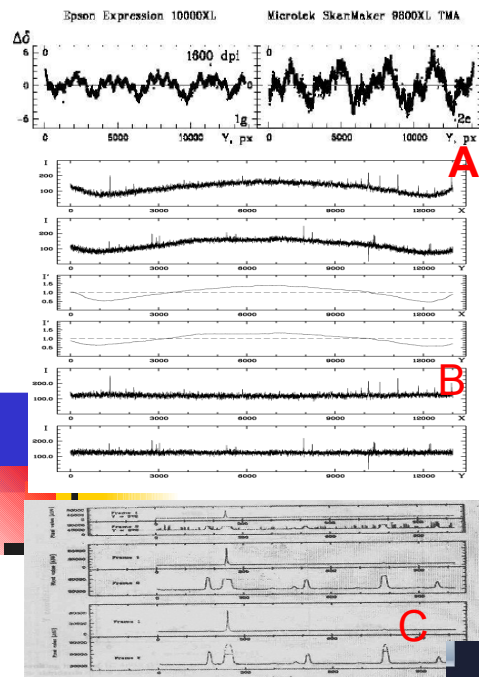
- 1 - Observational archives, currently included in JDA prototype
- 2 - Search Interface of Nikolayev AO for JDA data
- 3 - Search Interface of MAO NASU for JDA data

\* joint results of search are highlighted

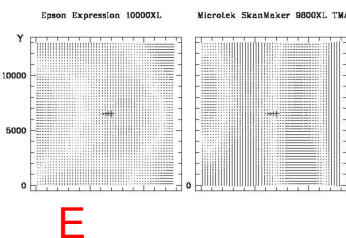




## MIDAS/ROMAFOT based calibration software

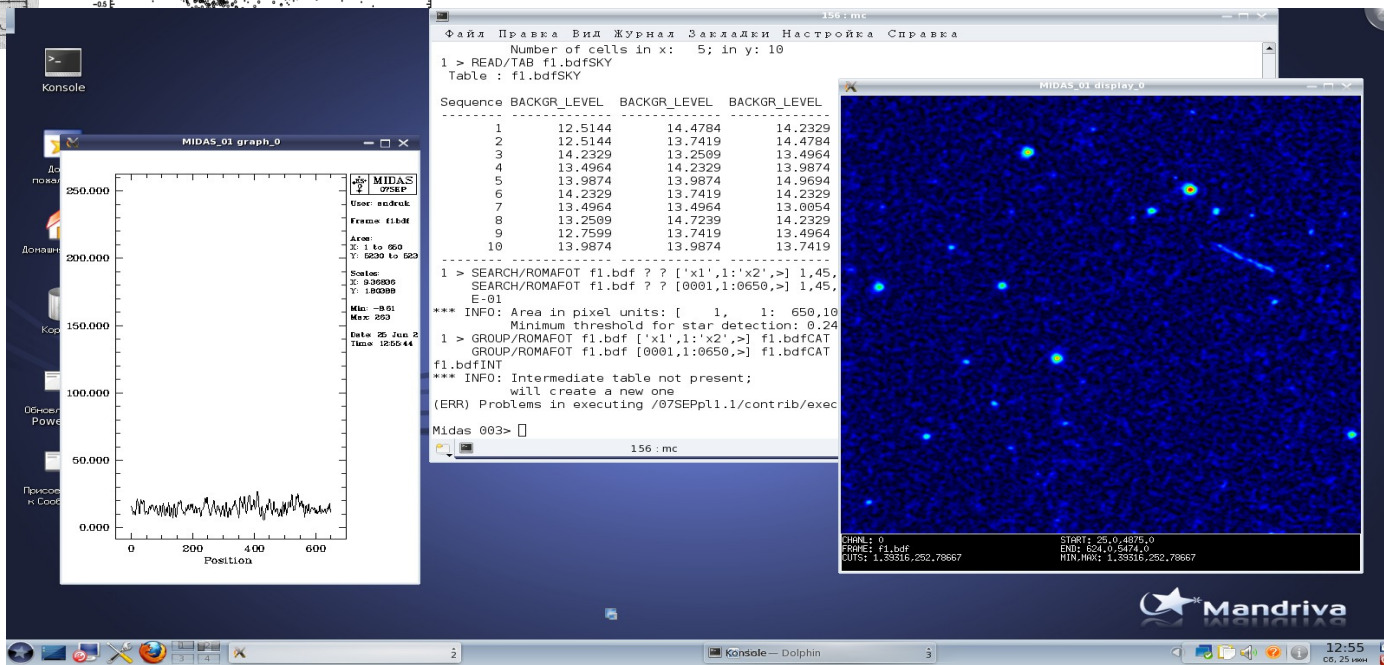


The initial processing of digitized images with calibrating software includes finding and eliminating of own flat field of the plate (B), finding and selection of objects, removing of «hot»pixels, restoration of overexposed images (C), removing of scanner mechanics errors (A).  
(D) - photometric characteristics for two exposures  
(E) - positional systematic differences over the field of plate  
(F) - internal positional accuracy for 2 scanners



Epson Expression 10000XL						Microtek ScanMaker 9800XL TMA					
n	B	$\sigma_a$	$\sigma_b$	N		n	B	$\sigma_a$	$\sigma_b$	N	
1	6.55	0.123	0.099	17		1	6.81	0.395	0.435	4	
2	7.64	0.092	0.098	30		2	7.66	0.369	0.383	25	
3	8.59	0.113	0.095	95		3	8.59	0.263	0.239	100	
4	9.58	0.087	0.087	275		4	9.60	0.159	0.145	281	
5	10.56	0.081	0.088	659		5	10.59	0.128	0.127	721	
6	11.59	0.080	0.084	1851		6	11.58	0.117	0.117	2024	
7	12.44	0.089	0.091	2099		7	12.45	0.128	0.128	2416	
8	13.29	0.090	0.103	386		8	13.31	0.137	0.136	512	
9	14.21	0.110	0.108	13		9	14.22	0.129	0.200	19	
	11.73	0.085	0.089	5425			11.80	0.130	0.129	6103	

Yatsenko A. et all, Kinematics and Physics of Celestial Bodies, 2011,- V.27,- №5P.- 49-59, in Russian.



# Mykolaiv Plate and CCD Archive

## Crimean Plate and CCD Archive

- The virtual observatory of the **Mykolayiv Astronomical Observatory** is under the final stage of its development. *Database of observations with access via Aladin*: Database contains textual information about 8405 plates and 7933 preview images. Plate scale: 101"/mm. Observational campaigns in: 1929-1931 and 1961-1999. Limiting magnitude: B=14m. Database contains textual information about 70000 CCD frames obtained with the AMC, the MCT and the FRT in 1996-2012. Database also gives links to 70000 preview CCD frames obtained in NAO in 2002-2012. Limiting magnitudes are R=16m, 14m, 18m for the AMC, the MCT and the FRT, correspondingly. *Astrometric catalogues of star in VOTable format* and other archives are available through Web-page: [http://www.mao.nikolaev.ua/ukr/vo2\\_u.html](http://www.mao.nikolaev.ua/ukr/vo2_u.html)
- In the database of **Crimean Astrophysical Observatory** the digitized plate archive is stored in «dBASE III+» formats and comprises the data of photographic observations of stars down to 12m -14m in photo visual waveband and down to 16m-18m in photographic waveband. The time intervals of these observations cover 1938-1965, 1984 yrs. Crimean archives are included into global WFPDB.



# Golosiiv Plate Archive

- The collection of glass plates in the archive of **Main Astronomical Observatory NASU** (Golosiiv plate archive – hereafter GPA) numbers near 85 thousands of negatives obtained in frames of various observational projects and starts in 1949. More than 26 thousands of them are the direct plates in the areas of the northern sky. The limiting magnitude of the most plates is 14m.0 – 16m.0.

The vast amount of information, contained in this archive, its partial regulation and absence of the unified systematization didn't allow to use the archive either in total efficiently or to find separate plates quickly. At the moment when photographic observations had been totally stopped, a sheer necessity arose to order and classifies all the information collected in MAO NASU during more than 60 years of observations. The process started in 2000 with mere ordering of boxes with plates, analyzing characteristics of plates from the point of view which instruments were applied, which goals were pursued and formats were developed for the observational log data digitizing.

GPA collection was obtained generally with the telescopes, installed in MAO NASU. 85% of the northern sky observations are conducted with five instruments: Double Long Focus Astrograph – 10.5 thousands of plates, Double Wide Angle Astrograph – 9.7 thousands of plates, Double Short Focus Astrograph – 4.2 thousands of plates, Three Camera Astrograph – 1 thousand, stellar telescope AZT-2 – 1.1 thousands. The residue of plates was obtained on four foreign instruments in Ecuador, Uzbekistan and Russia.

See DBGPA V2.0 <http://gua.db.ukr-vo.org>



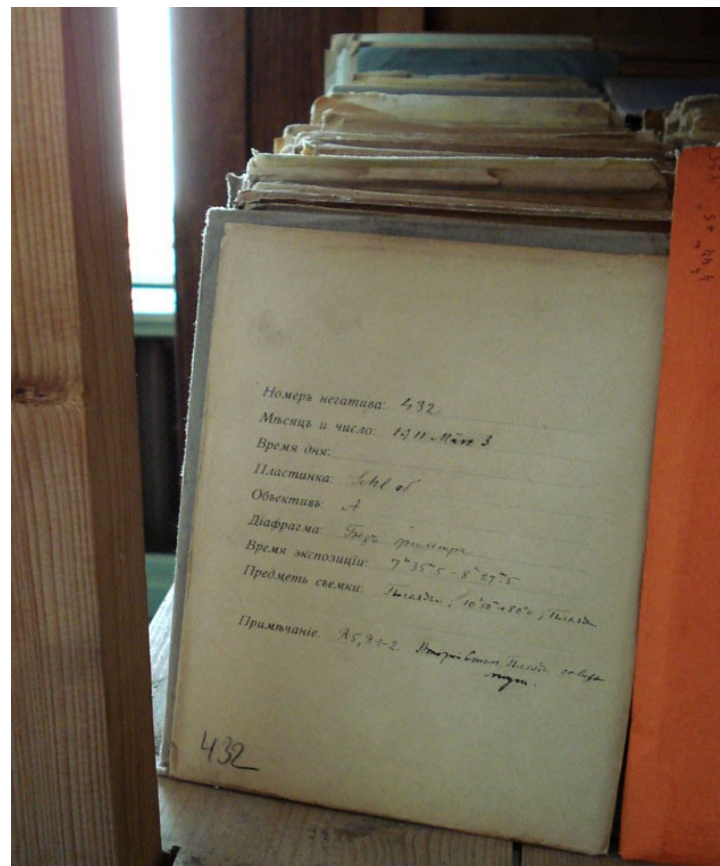
**Astronomical Observatory, Odesa National University,  
Simeiz archive (1909-1954) – 10,000 glass plates**



## Simeiz collection

**In 1966 the Simeiz (Crimean)  
collection  
of about 10,000 glass plates  
exposed in 1909-1953  
was conveyed to Odesa AO.**

*Record at the envelope with a  
glass plate is dated  
by March 3, 1911*

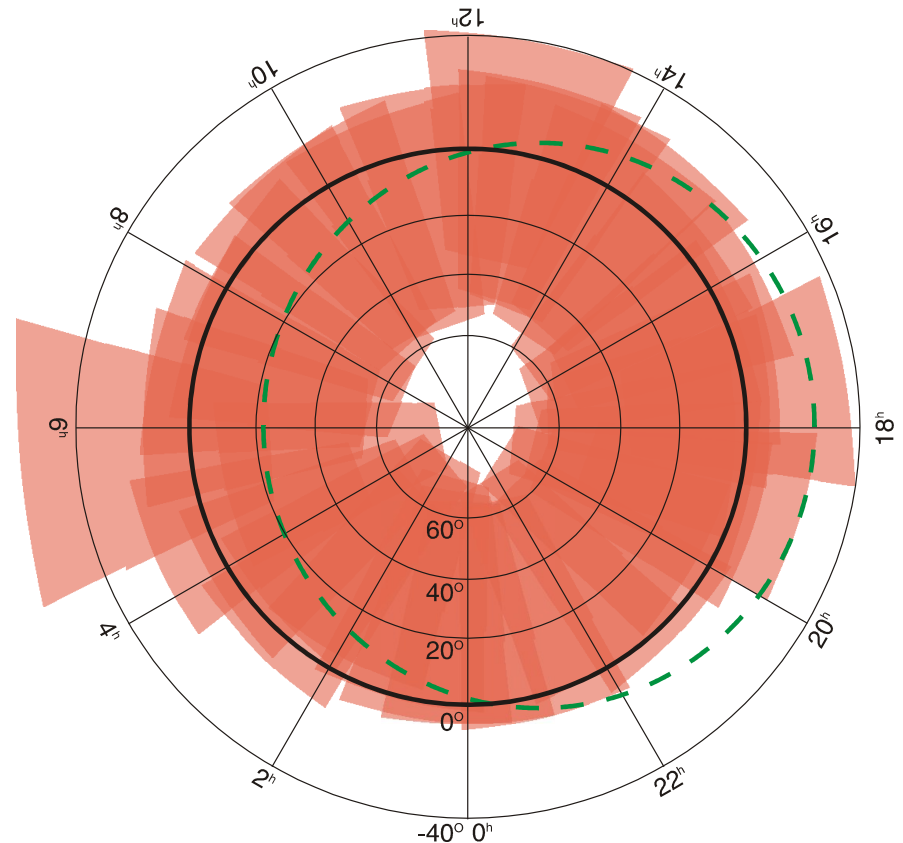
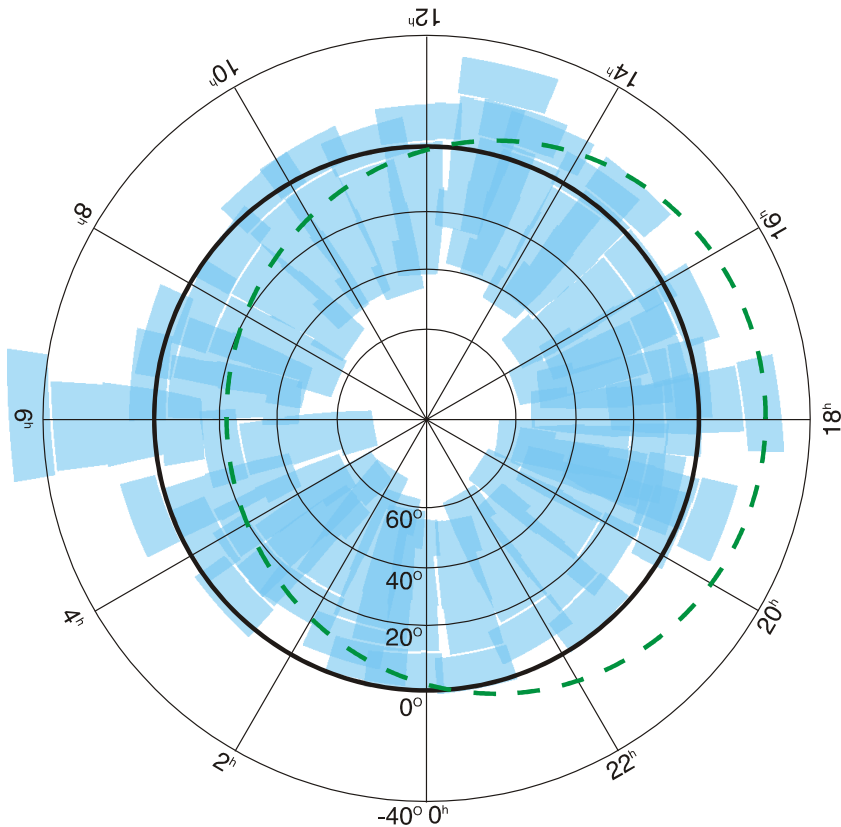







**Astronomical Observatory, Odesa National University**  
**Astronegative's archive (1957-1998, photometrically**  
**homogeneous,  $m_v=12$   $m_{pg}=15$ ) – about 84,000 plates**

**Scheme of covering the sky by the fields of 3, 4, 5, and 6 cameras, III series (blue) and of 1, 2, and 7 cameras, III series (red), 7-camera astrograph**







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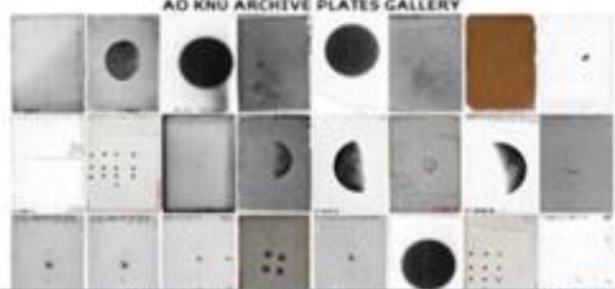
# UKRAINIAN VIRTUAL OBSERVATORY


HOME CONCEPTION CONSORTIUM RESOURCES VO LINKS

**AO KNU HISTORICAL ARCHIVE**

VIEW AS: [table with metadata](#) [thumbs and scan info](#) [gallery](#)

**AO KNU ARCHIVE PLATES GALLERY**





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# UKRAINIAN VIRTUAL OBSERVATORY

HOME CONCEPTION CONSORTIUM RESOURCES VO LINKS

**AO LNU HISTORICAL ARCHIVE**

[table with metadata](#) [thumbs and scan info](#) [gallery](#)

**AO LNU ARCHIVE PLATES**

id	numb. of exposures	duration	data	object	note	Instrument
1,12	1	miss	miss	data on exposure and object	50/10 cm Zeiss	
1,13	3	00.00.00	00.00.00	expositional data on exposure	50/10 cm Zeiss	
1,14	6	00.00.00	00.00.00	expositional data on exposure	50/10 cm Zeiss	

**SCIENTIFIC PROJECTS**

- JDA
- FORAC
- CCD DB
- catalogues

**SOFTWARE**

- SW calculation
- SW DA

**HISTORICAL ARCHIVES**

- AO KNU HA
- AO LNU HA


Fig.5. UkrVO portal pages devoted to the historical parts of glass collection of two observatories



# Conclusion– UkrVO Sci. Projects

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- Creation of the UkrVO Joint Digital Archive
- Software for JDA and for the local data archive of observatories
- Science with UkrVO JDA
  - new stellar catalogue (for fainter objects)
  - search for new Solar System small bodies (small planets, transneptunian objects, comets, space debris)
  - search and study for variable stars
  - search for GRB's counterparts
  - multi-wavelength extragalaxy research (cross-correlation of ground-based long-term monitoring data in optical with the data from space mission in X-ray, gamma for estimation, for example, the black hole mass in AGNs)
  - study of solar active formations and their evolution during the solar activity cycle

- 
- Instead of the final remarks we would like to point IAU's Commissions attention that the ASTROPLATES project needs the additional financial and scientific support and could be organized, for example, in frame of the HORIZON-2020 program as the cooperation of the European astronomical observatories, which hold this unique astroinformation resource. Due to such support, it seems, such a project will have a success to be finalized till 2020.

- References

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- [7] Tsvetkov, M.K.: 1992, IAU Working Group on Wide-field Imaging Newsletter No. 2, p. 51.
- [8] Tsvetkov, M.K.: <http://www.wfpdb.org/catalogue.html>



tel: +380 44 526 3110  
fax: +380 44 526 2147  
mail: support@ukr-vo.org

# UKRAINIAN VIRTUAL OBSERVATORY

UkrVO site <http://ukr-vo.org>

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Thank you for your attention!