



Wide-Field Plate Database: New developments

Milcho Tsvetkov

*Sofia Sky Archive DataCenter
Bulgarian Academy of Sciences*



Greece, PLATAMONAS, 06.09.2009

Abstract

The development for last 15 years of the Wide-Field Plate Database (WFPDB, <http://www.skyarchive.org>) as an initiative of the IAU Working Group on Sky Surveys, hosted by Commission 9, is discussed. This database contains descriptive information for more than 2200000 total numbers of observations from the archives of 125 professional observatories operated in the period 1872-2005 all over the world. De facto the database is an instrument for searching the long term brightness variations of existing (registered) sky objects mainly to the 14(B) magnitude. The WFPDB base has a mirror in the AIP, Potsdam (<http://vodata.aip.de/WFPDBsearch/>) and its first version works under VizeIR . <http://webviz.u-strasbg.fr/viz-bin/VizieR?-source=VI/90>. Currently the WFPDB provides access to the information for more than 30% of the estimated archives total number. Following the requirements of the Centre de Données Astronomiques de Strasbourg (CDS) and International Virtual Observatory Alliance (IVOA) the WFPDB contains the digitized plate preview images, as well as digitized plate row data using the new generation of the flatbed scanners. The WFPDB team continues to enlarge the database with submitted or retrieved information from the photographic plates which enable the astronomical community to complement their investigations going more than 100 years back in time. The newly created Bulgarian Virtual Observatory (BGVO, <http://www.bgvo.org/>) is closely related with the WFPDB development and its participation in the EC initiatives in the frame of the EURO VO Data Center Alliance.

WF

● WF

- C

- F

- S

- P

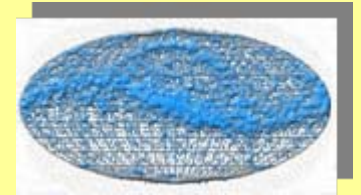
● Co

The screenshot shows a Netscape browser window titled "The Wide-Field Plate Database - SOFIA - Netscape". The address bar shows "http://www.skyarchive.org/". The main content area features a large oval image of a star field with the text "WFPDB SOFIA" overlaid. To the right, the title "WIDE-FIELD PLATE DATABASE" is followed by contact information for the Institute of Astronomy and Space Research Institute at the Bulgarian Academy of Sciences. A date stamp "March 20, 2005" is present. Below the main text is a vertical column of green buttons: "About the WFPDB", "Catalogue of WFPDB", "Search in the WFPDB", "Digitization", "WFPDB Team", "Publications", and "WFPDB Sponsors". To the right of these buttons is a "News & Updates" section with a "HyperLeda" logo and text "SSADC & Astron. Obs. Uni-Sofia MIRROR". Below that is a "STARGAZER" section described as a "Web based generator for sky maps drawing." and a "MORE: DOCUMENTS & LINKS" section. The browser's status bar at the bottom shows "Document: Done".

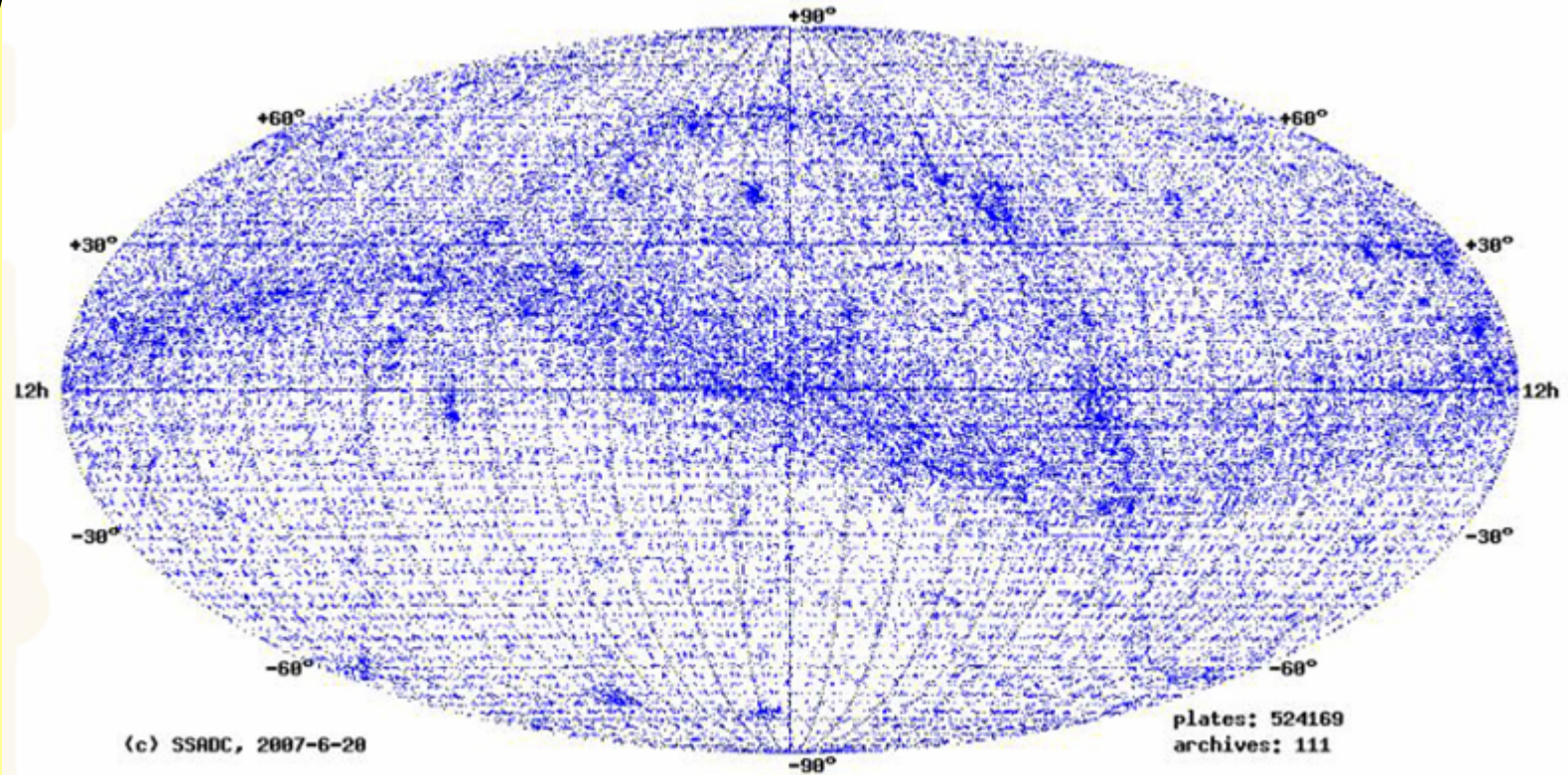
ns:

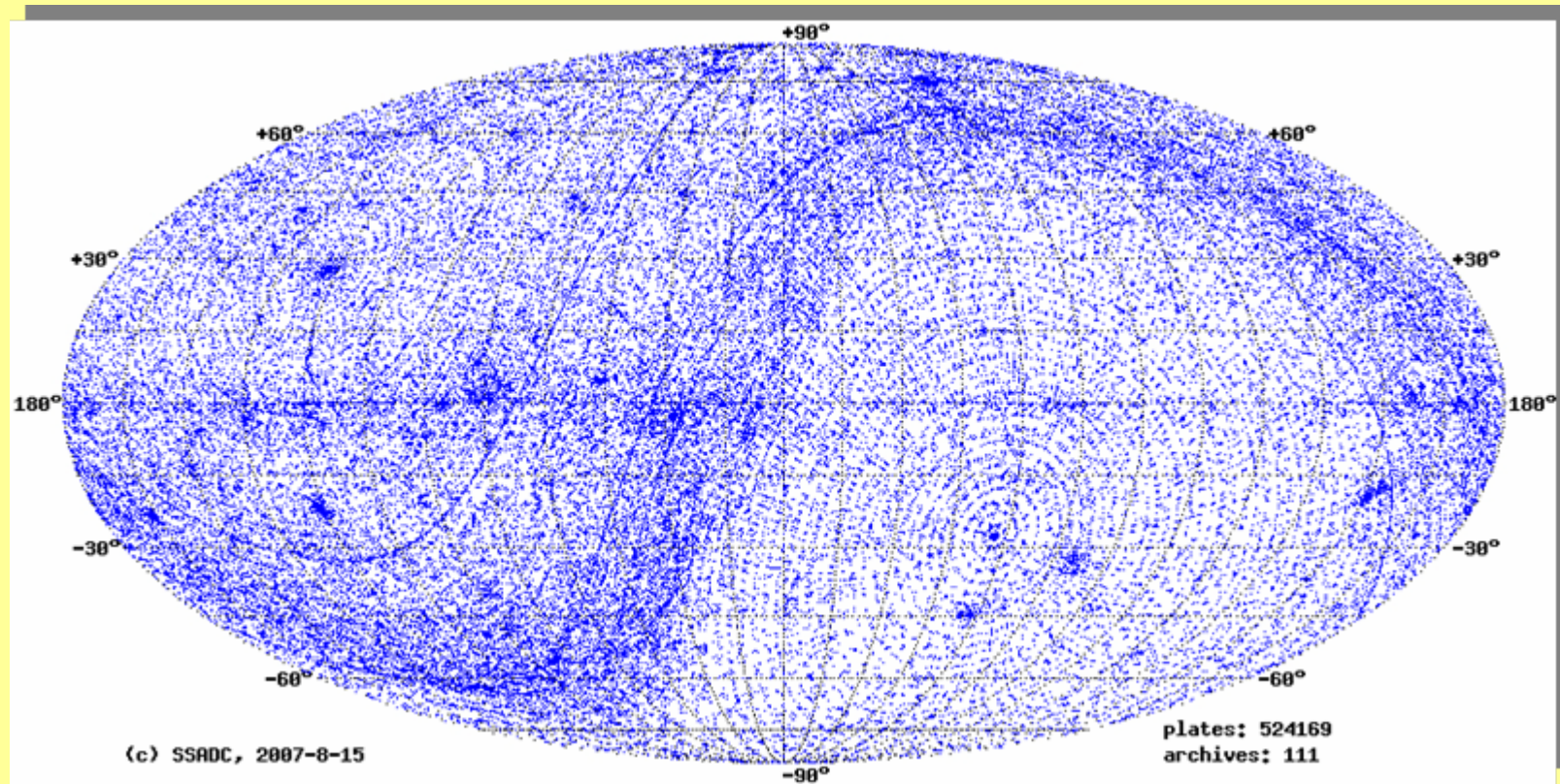
Web Site: <http://www.skyarchive.org>

WFPDB Project Goals

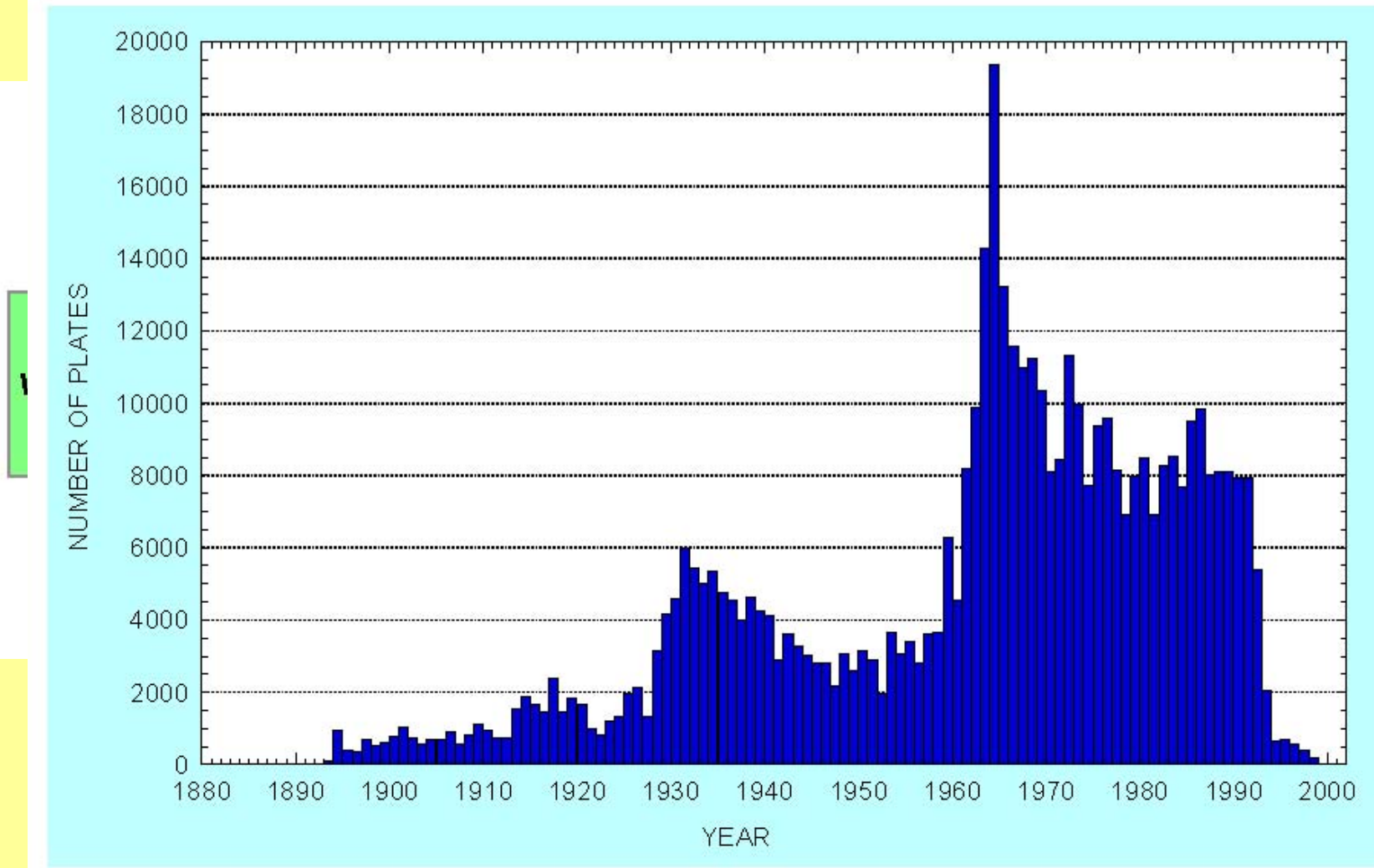
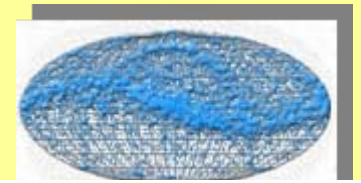


V



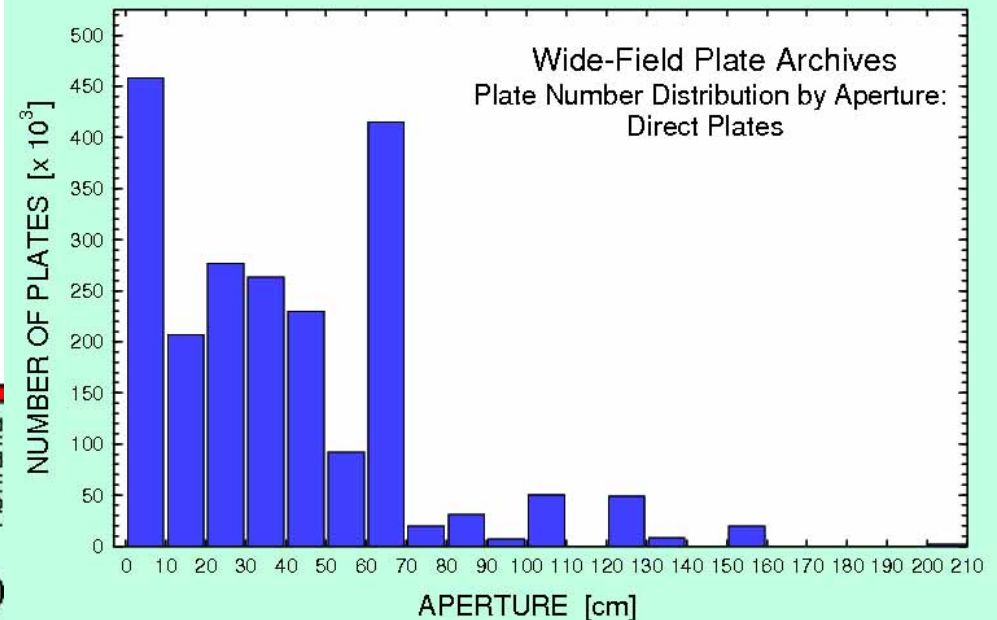
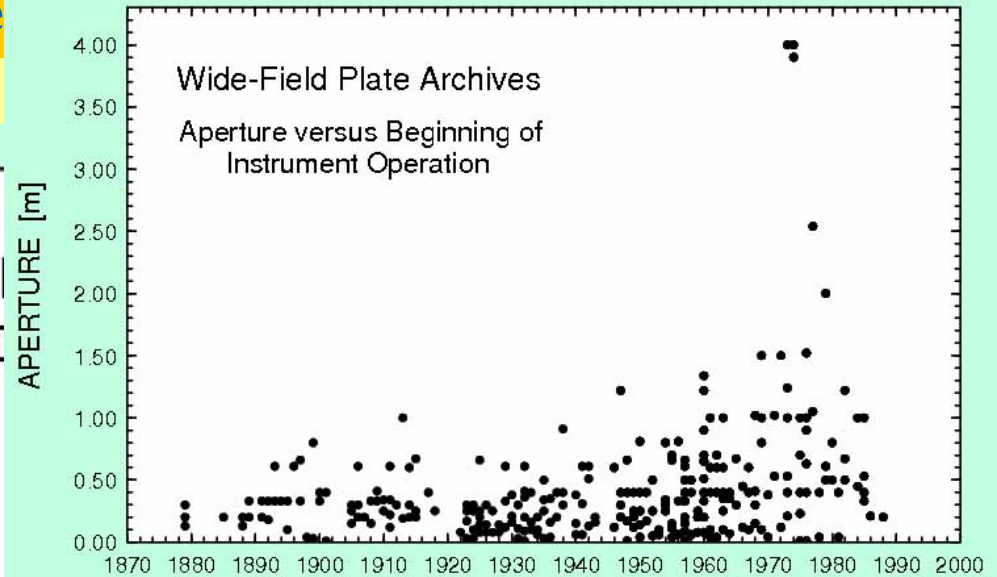
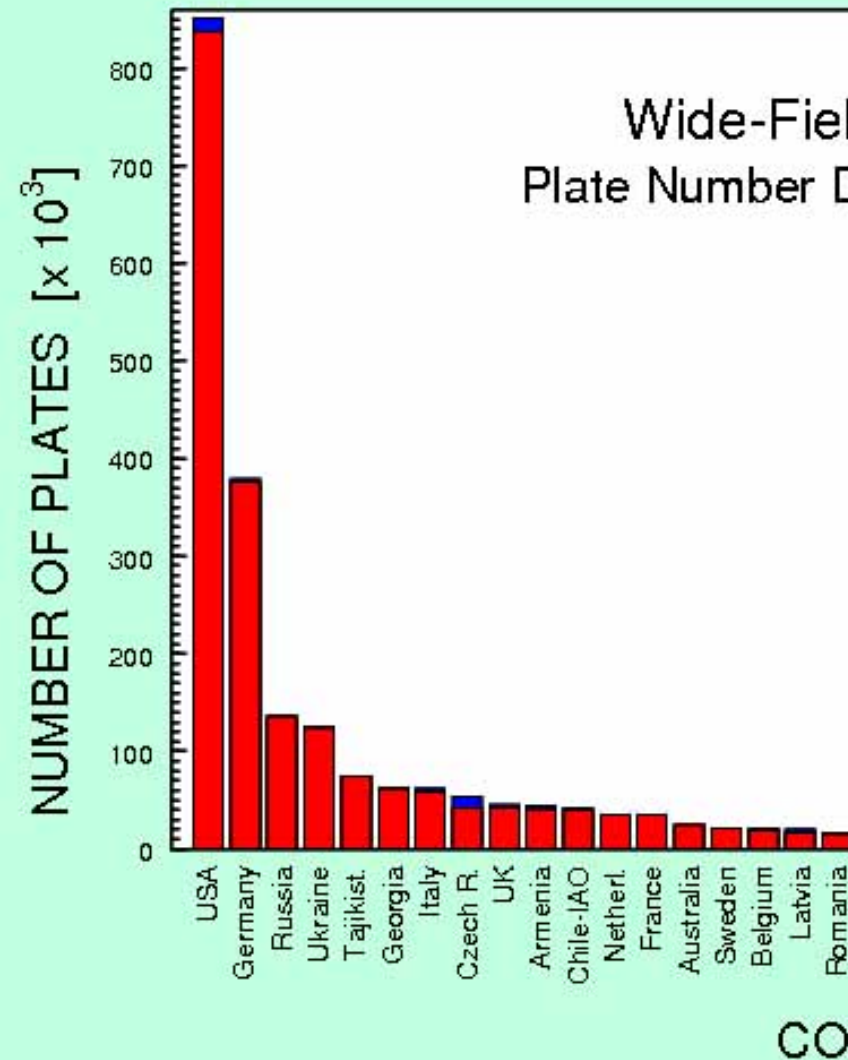


WFPDB structure



The WFPA-WFPDB

<http://www.skyarchive>





Database SEARCH engines

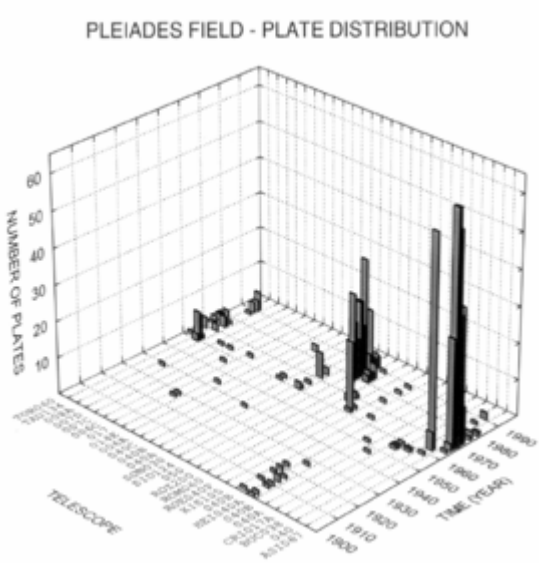
Netescape: Catalogue Selection Page

CDS · Simbad · VizieR · Aladin · All Catalogues · Nomenclature

VizieR is also accessible from NASA ADC, USA and from Very Large Catalogues (GSC and USNO-A2.0) can also be targets

This page presents a list of catalogue table(s) matching your selection

Check before The The



WFPDB search page - Netscape

Location: <http://draco.skyarchive.org/search/>

Additional display

Angular Distance from Field Centre Has preview

Select All

Search by Constraints applied on Columns

Show	Sort	Column	Constraints	Units	Explain
<input checked="" type="checkbox"/>	<input type="radio"/>	IDobs	<input type="text"/>	(char)	WFPDB observatory identifier
<input checked="" type="checkbox"/>	<input type="radio"/>	IDins	<input type="text"/>	cm	Instrument aperture
<input checked="" type="checkbox"/>	-	IDsuf1	<input type="text"/>	(char)	Instrument aperture suffix
<input checked="" type="checkbox"/>	<input type="radio"/>	IDno	<input type="text"/>		Original plate number
<input checked="" type="checkbox"/>	<input type="radio"/>	OBJNAM	<input type="text"/>	(char)	Object or field designation
<input checked="" type="checkbox"/>	<input type="radio"/>	OBJTYP	<input type="text"/>	(char)	Object type code
<input checked="" type="checkbox"/>	<input type="radio"/>	METHOD	<input type="text"/>		Method of observation code
<input checked="" type="checkbox"/>	<input type="radio"/>	MULTEX	<input type="text"/>		Multiplicity of exposure
<input checked="" type="checkbox"/>	<input type="radio"/>	EXP	<input type="text"/>	min	Exposure time
<input checked="" type="checkbox"/>	<input type="radio"/>	EMULS	<input type="text"/>	(char)	Emulsion type
<input checked="" type="checkbox"/>	<input type="radio"/>	FILT	<input type="text"/>	(char)	Filter type
<input checked="" type="checkbox"/>	<input type="radio"/>	SPEC	<input type="text"/>	(char)	Spectral band
<input type="checkbox"/>	<input type="radio"/>	DIMx	<input type="text"/>		X dimension of plate
<input type="checkbox"/>	<input type="radio"/>	DIMy	<input type="text"/>		Y dimension of plate
<input type="checkbox"/>	-	All	<input type="text"/>		

Copyright ©, 2001-2003, Sofia Sky Archive Data Center



WIDE-FIELD PLATE DATABASE - Microsoft Internet Explorer

DATE: 02 11 00 PAGE: 16

Address: <http://draco.skyarchive.org/search/search.cgi?service=preview&mainID=59770&full=1>

Search X
Ne >>
Choose a category for your search:
 Files
 Folders
 Links
 Local
 Favorites
 Recent
 Other

Find Web content
 Bring to you by MSN Search

Search for other items:
[Files](#)
or
[Folder](#)
[Computer](#)
[People](#)

PREVIEW:

[Close this page](#)

Done

Internet

N Netscape: Stargazer v1.2.1

File Edit View Go Communicator Help

Back Forward Reload Home Search Netscape Print Security Stop

Bookmarks Location: <http://www.astro.bas.bg/stargazer/stargazer.cgi?DSMMAG=10&COORDEQ=20> What's Related

Members WebMail Connections BizJournal SmartUpdate Mktplace

Home Search StarGazer Documentation

Visualization!

To get the necessary stellar map, fill the "map" button. For more information refer to the "Help" button.

Pleiades
(Probably the M45)

Center RA: (hh:mm:ss)

Coordinates equinox: (yyyy)

Field of view: (dd:mm)

Magnitude limit:

Deepsky objects catalog:

Label type:

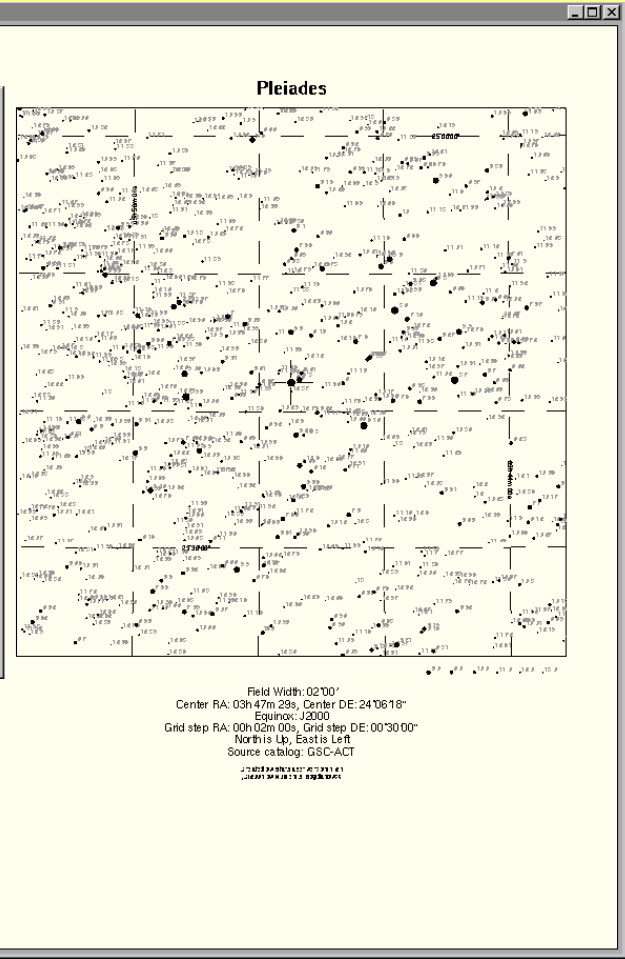
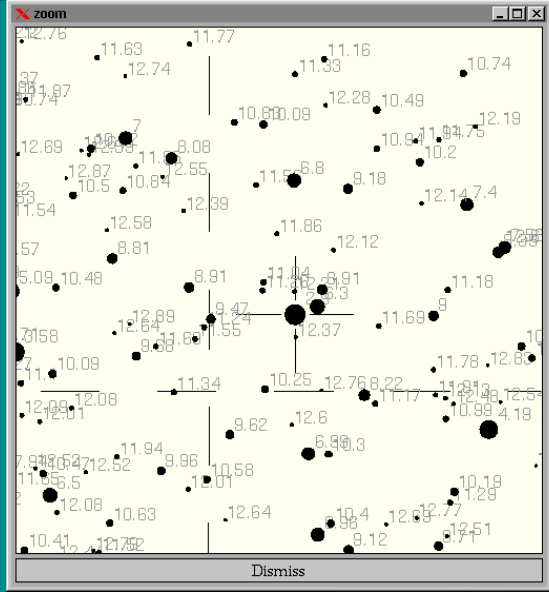
Grid density:

Put center mark:

Ghostview, version 1.5

Pleiades
Mon May 20 20:59:51

zoom



Web Site:<http://www.skyarchive.org>

Wide-Field Plate Database
Plate Number Distribution by Continents
Total Number of Plates: 2185501.

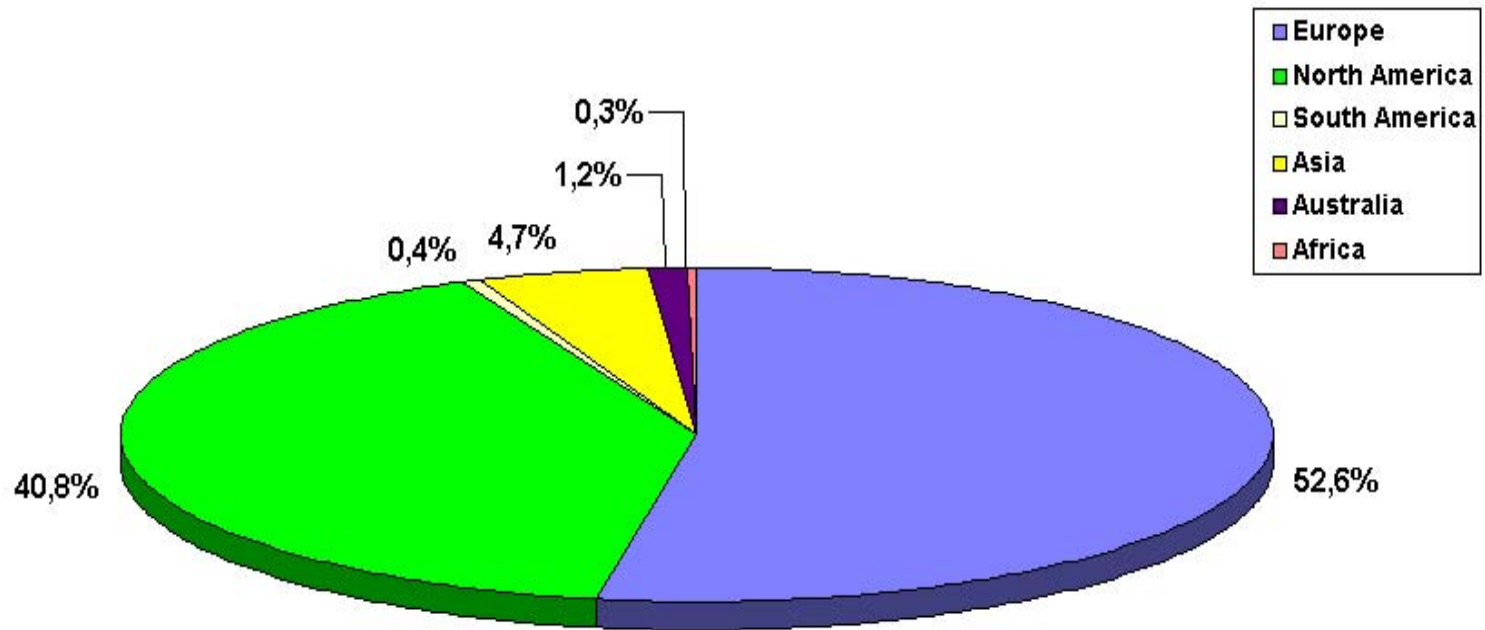


Plate Digitization -

Different approaches

- Plate scanning using:
 - PDSs, Super Cosmos, USNO Monet scanner, LAMA's STScI MAMA, APM etc.
 - NEW: Flatbed Scanners: EPSON 1640XL, UMAX Etc.
 - CCD Previews (new)

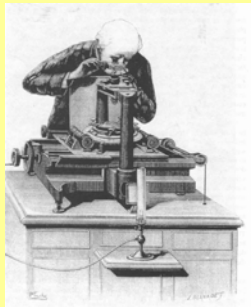
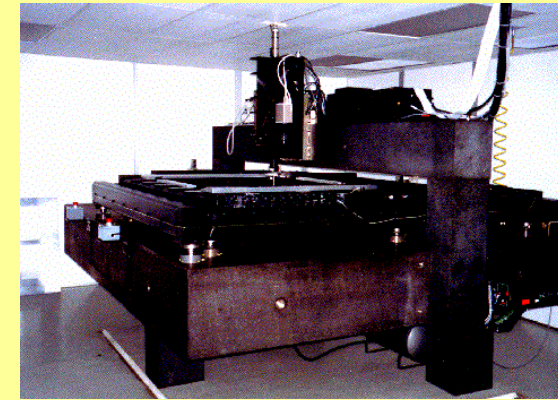


Automating the Measurements

*The Grant 2
Measuring
Engine-1967



**PMM (NRO ~1988)



1886

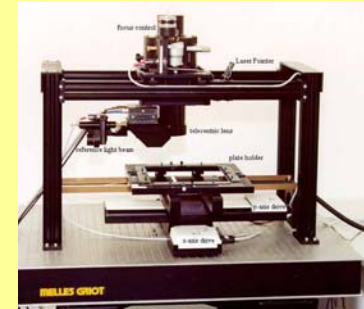


*Gaertner single screw
engine 1916

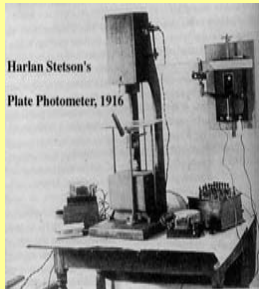
Astrometric Photometric



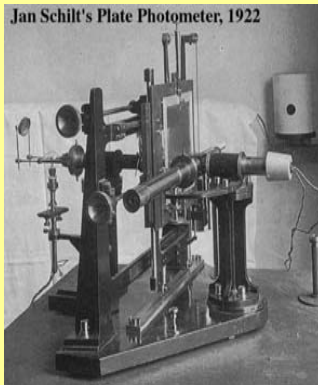
*Perkin-Elmer
PDS ~1980



Tautenburg~1995



*1916



Jan Schilt
Photometer -
1922

*<http://www.astro.virginia.edu/~rjp0i/museum.html>
**http://www.nofs.navy.mil/projects/pmm/pmm_caption.html

Slide after Bob Simcoe

STATUS OF PLATE ARCHIVING AND DIGITIZATION

EUROPEAN PLATE ARCHIVES

Total EU WF-plates

- European direct plate archives: 1129367 plates
- European spectral (objective prism) plate archives: 46276 plates

Totally: **306** (70%) plate archives: **1,175,643** (52%)
plates

EU Plate Digitization - current status

EUROPEAN digitized plates last 5-7 years:

Sonneberg: 300000 FB 4xHP **150 000** (20 μ /pix)

Pulkovo: 50000 FB 1x UMAX **30 000** (20 μ /pix)

Tautenburg: 9000 TLSW_Scanner: **4058**(10 μ /pix)

Asiago: 20000 2xEPSON1640XL **3000** (16 μ /pix)

Byurakan: 20000 EPSON1680 ~1874 (16 μ /pix) FBSS

Bamberg: 25000 EPSON 1640: **1000** (16 μ /pix) ~ **2000**

preview (40 μ c)

Heidelberg(ARI):ARI 400 EPSON10000XL **344** POSSS

plates (10 μ /pix)

Heidelberg(LSW): 20000: MPI/LSW 200 scanner:

Heidelberg NEXSCAN F4100

More:

EU Plate Digitization - current status (more...)

Konkoly: 13000 UMAX PL3000 **500** 8 (mic/pix), **500** (20 mic/pix)

Potsdam: 20000 AIP EPSON10000XL **300** (10mic/pix) (1000 CdC GAVO)

Brussels:20000 ROB Agfa DUOSCAN HiD ~**600** (250) mic/pix (preview)
A4 Precise scanner (in development)

Sofia: 10000 EPSON 1640XL **300** (16mic/pix)

Moscow: 20000 GAISH CREO ~**200** (10 mic/pix)

Moscow: INASAN 4000 : 2xEPSON 1640XL (?) 16 (mic/pix)

Kiev: 24000: Microtek ScanMaker 9800XL (digitization just started)

Bucharest: 12000 Umax AlfaVista II. **100** (10 mic/pix) CCD-preview

Cluj: 5000, HP **200** preview,

Belgrade: 12000 EPSONV700 test scans

Vatican: 10000: EPSON 1640XL (16mic/pix)

Jena: 1000 EPSONV700 test scans

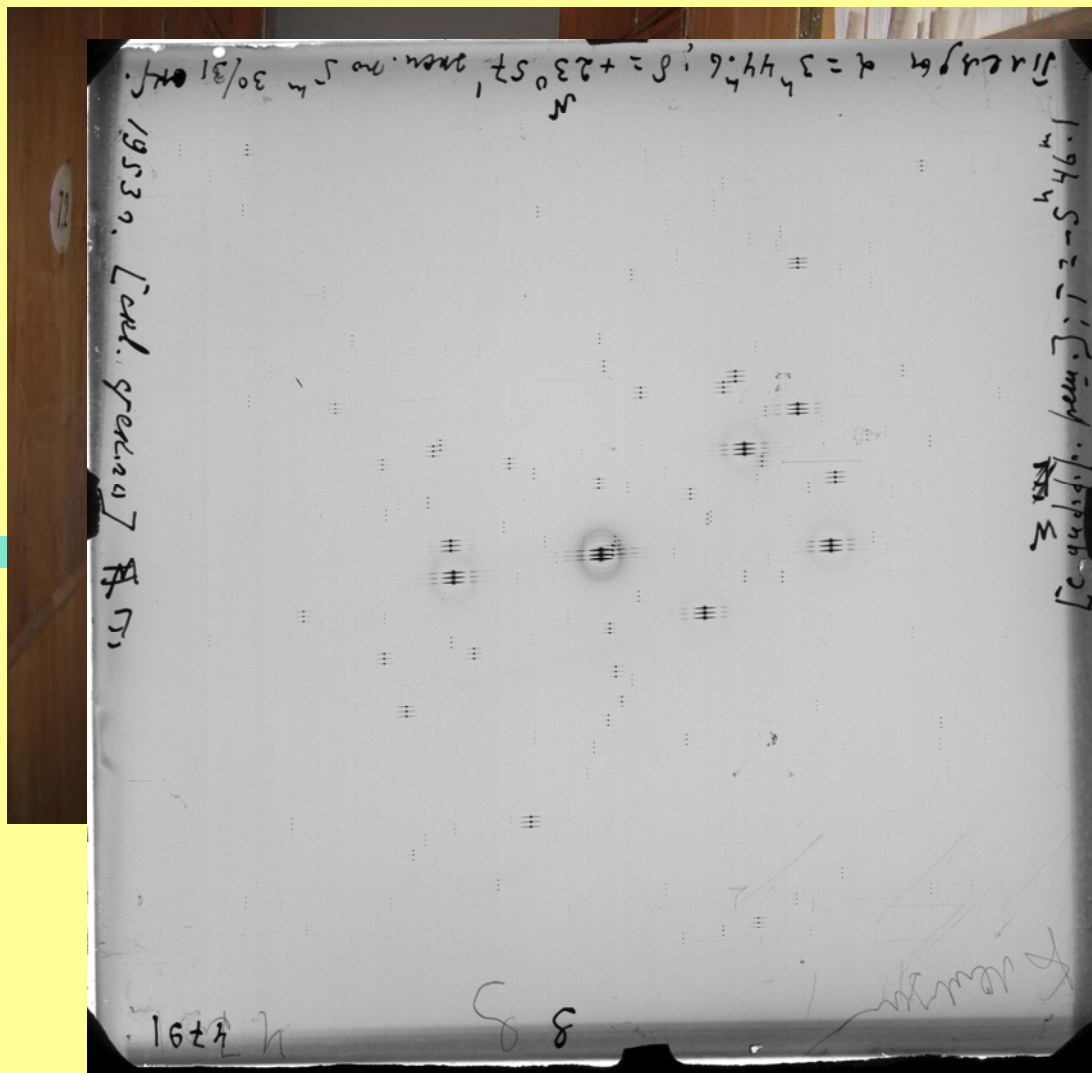
Tatranska Lomnoca: 12000 EPSONV700 test scans

Totally: more than 220 000 !!! scanned for last 5-7 years.

Sonneberg Plate Archive



Pulkovo Plate Archive



Tautenburg Plate Archive

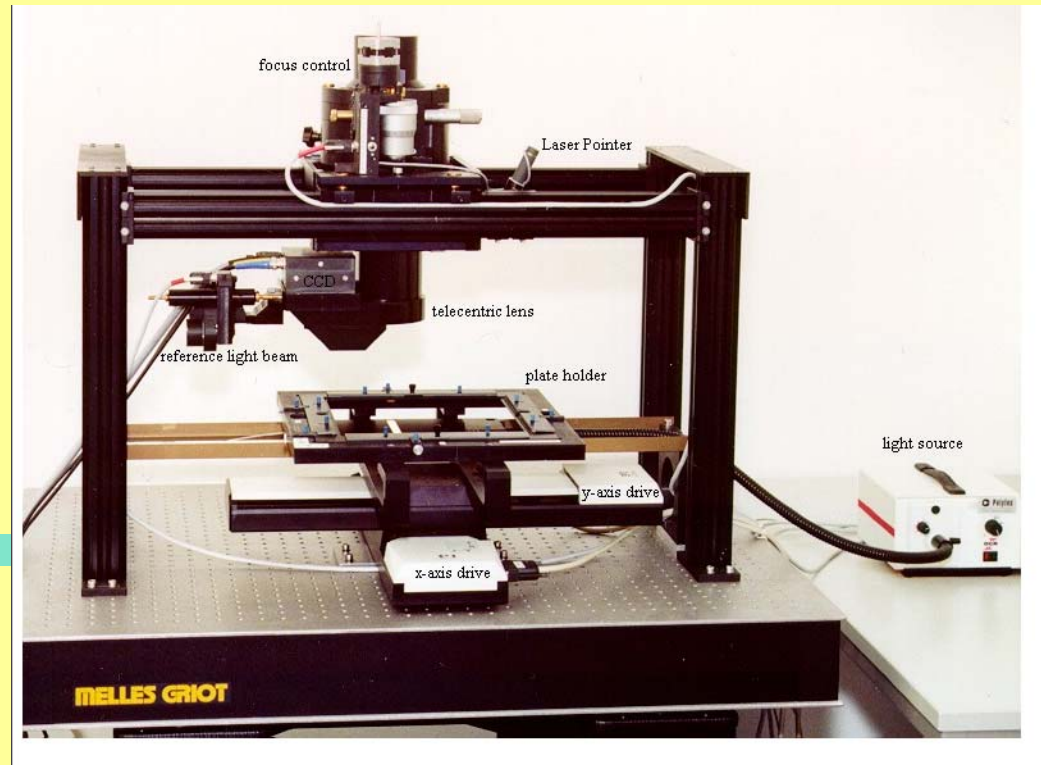


Plate archive contains about 9000 plates, TL5W_Scanner

Digitized **4058** plates (10mic/pix) - about 50% (local database)

<http://www.tblsw.de>

Asiago Plate Archive

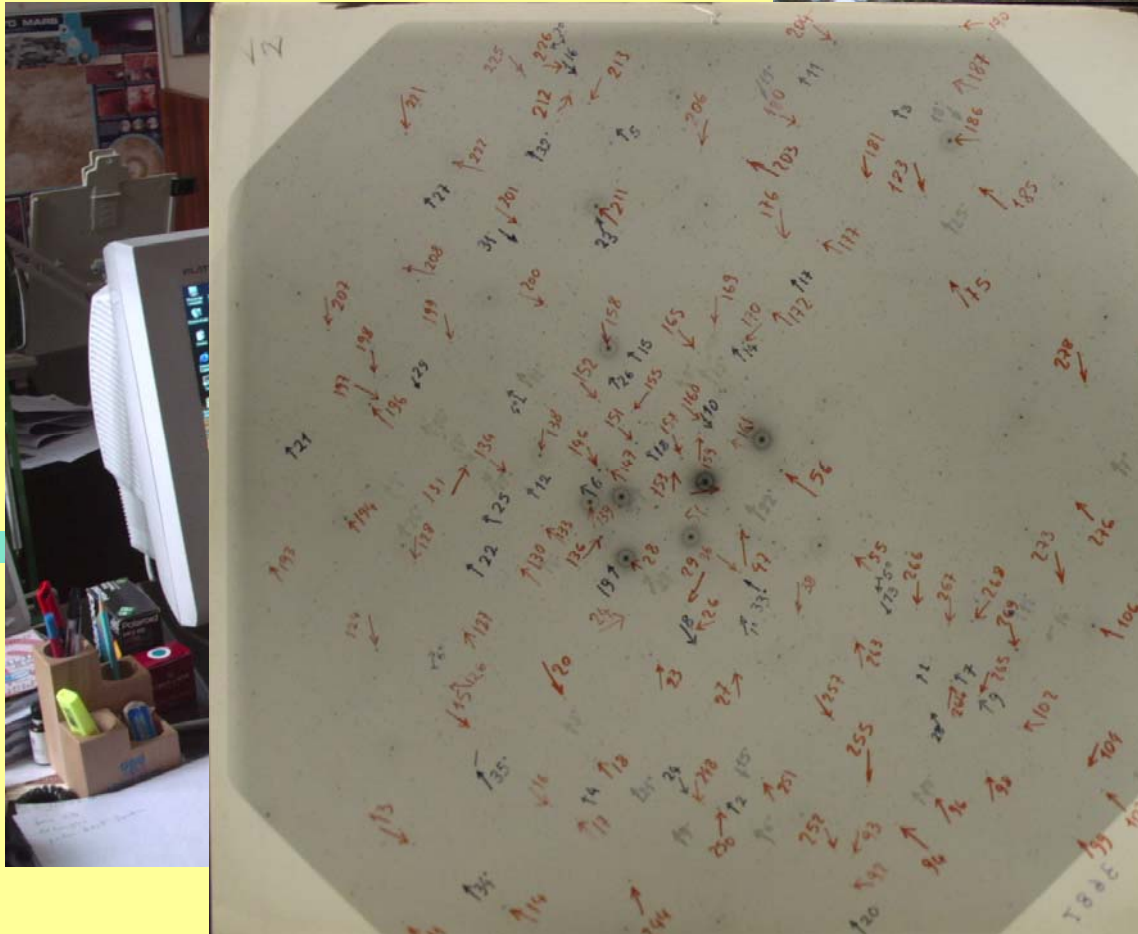


Plate archive contains about 20000 plates, 2xEPSON1640 scanners

Digitized 700 plates (16mic/pix) - National level project (Local database)

<http://www.astropd.it>

Bamberg Plate Archive

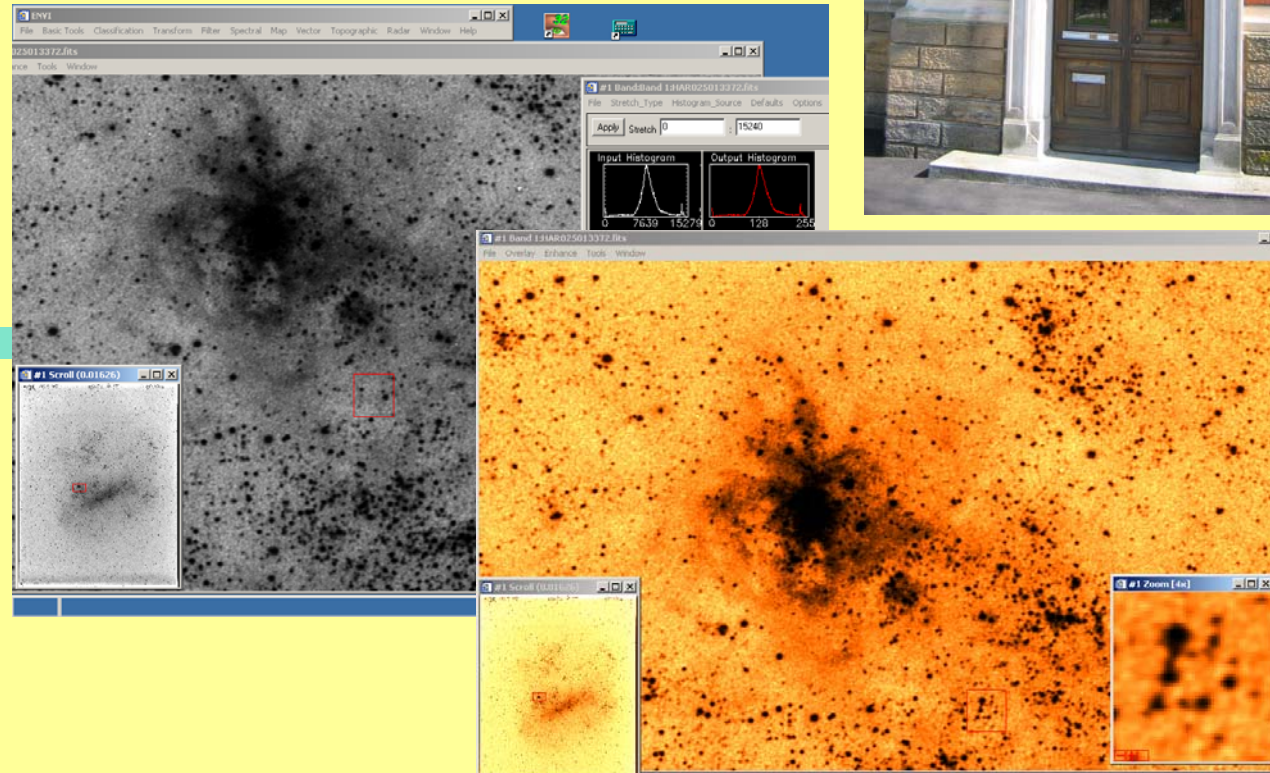


Plate archive contains about 29000 plates, EPSON1640 XL

Digitized 1000 plates (16mic/pix) - DFG/AvH project (WFPDB link)



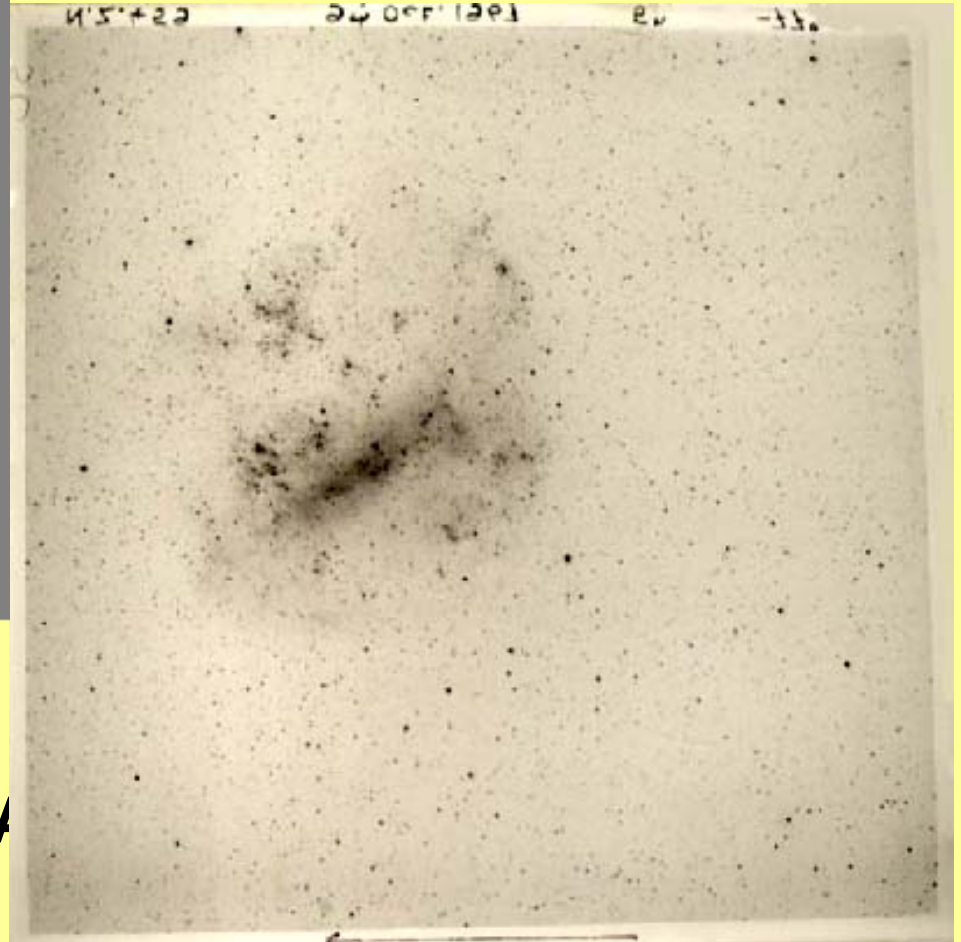
Southern Bamberg PPSS:

22000 plates taken in SA 1963-73



archive importance.

- Project supported by A



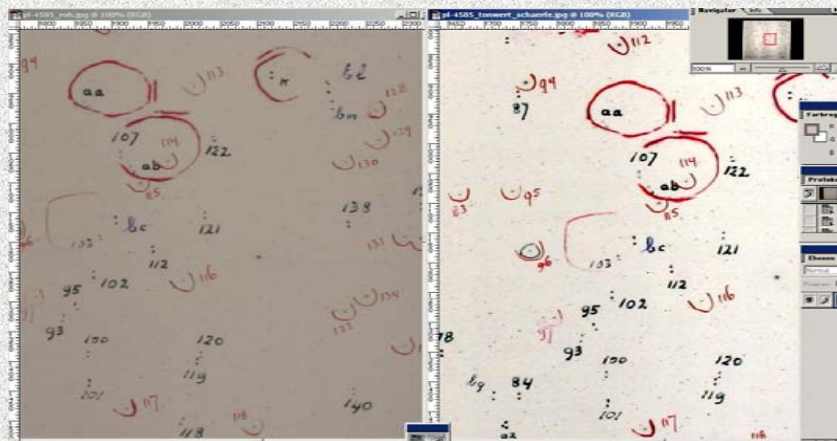
Heidelberg Plate Archive (ARI)



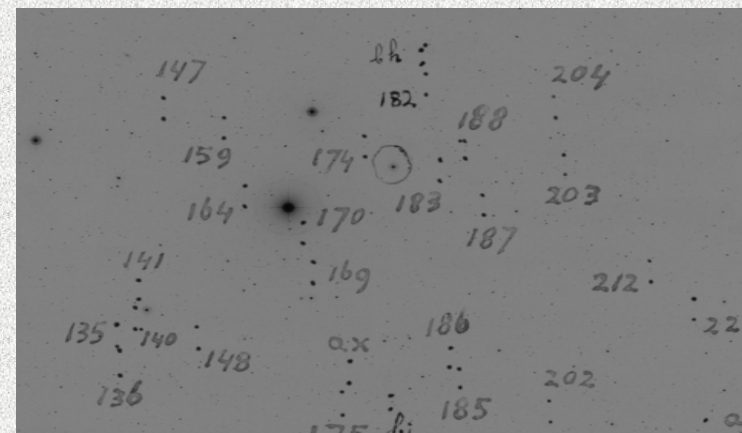
G. Burkhardt

Plate archive contains about 20000 plates, EPSON 10000 XL

Digitized 344+ more (10mic/pix) - Klaus Tschira Private foundation support (0.5TB)



Documentation: image processing



P-L plate detail as seen from the glass side

Heidelberg Plate Archive (LSW-MPI)



Plate archive contains about 20000 plates, HEIDEBERG Nexscan_F4100

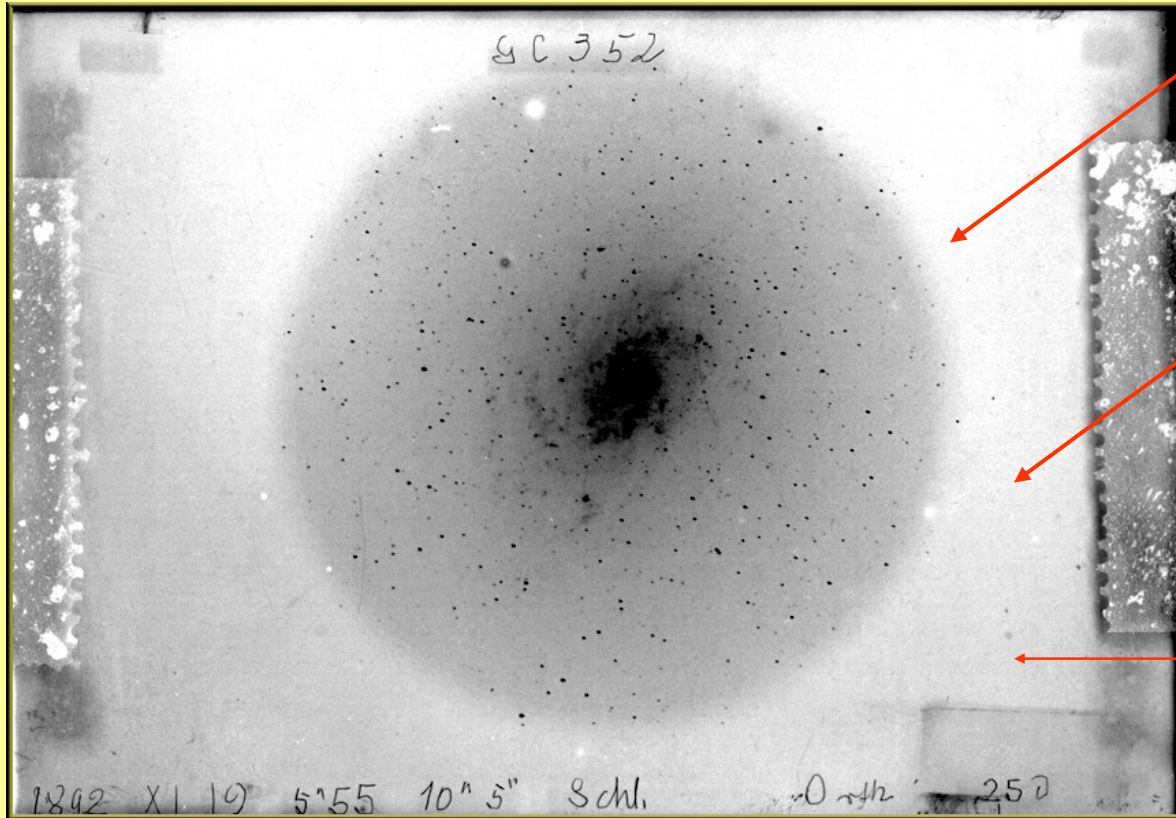
Digitization started (10mic/pix) - LSW and MPI plates will be digitized

O. Lohse Historical Plate Achieve, Potsdam 1879-1896

60 plates survive two WW from 214 in AIP



More Historical Surveys



Szombathely(H)
M33(1892)
Vincze & Jankovics

Brussels (ROB)
CdC(1914)
Lampen's et al.

Carte de Ciel
Alain Fresneau
100y old plates
IAU WG



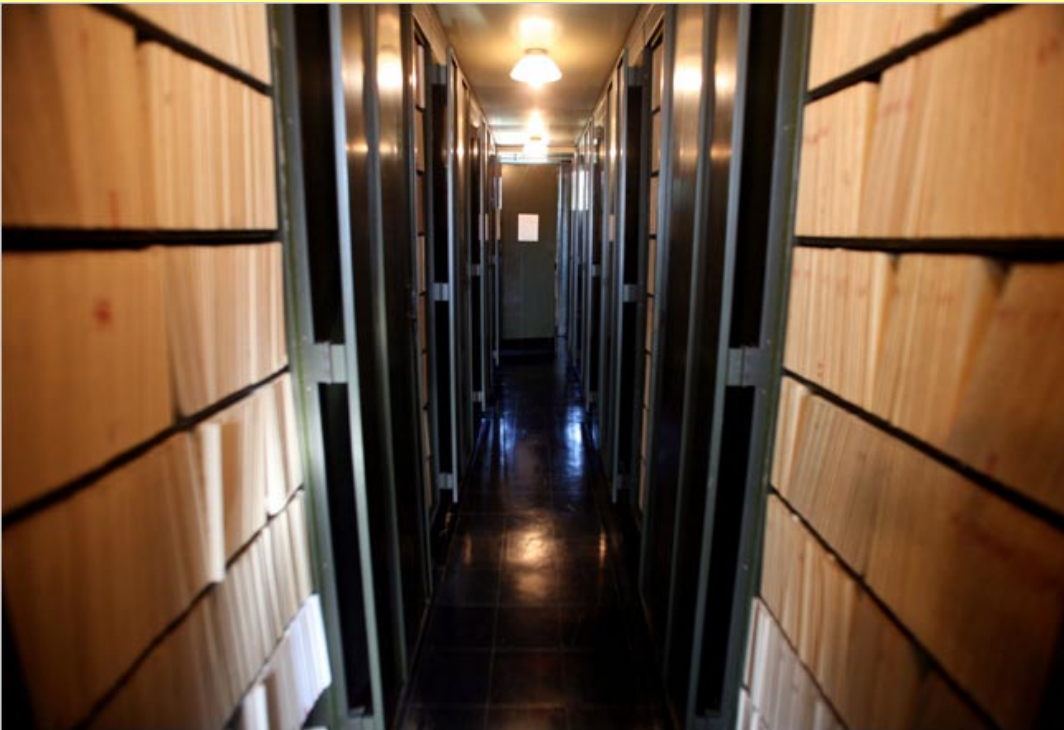
STATUS OF THE PLATE ARCHIVING AND DIGITIZATION

US PLATE ARCHIVES

HARVARD WF-plates 500 000 Plates

PARI INICIATIVE

TOTALLY about 1 000 000 plates



Harvard Plate Stacks

500 000, 3 floors

~ 160 Tons

**Nikon D200
Station**

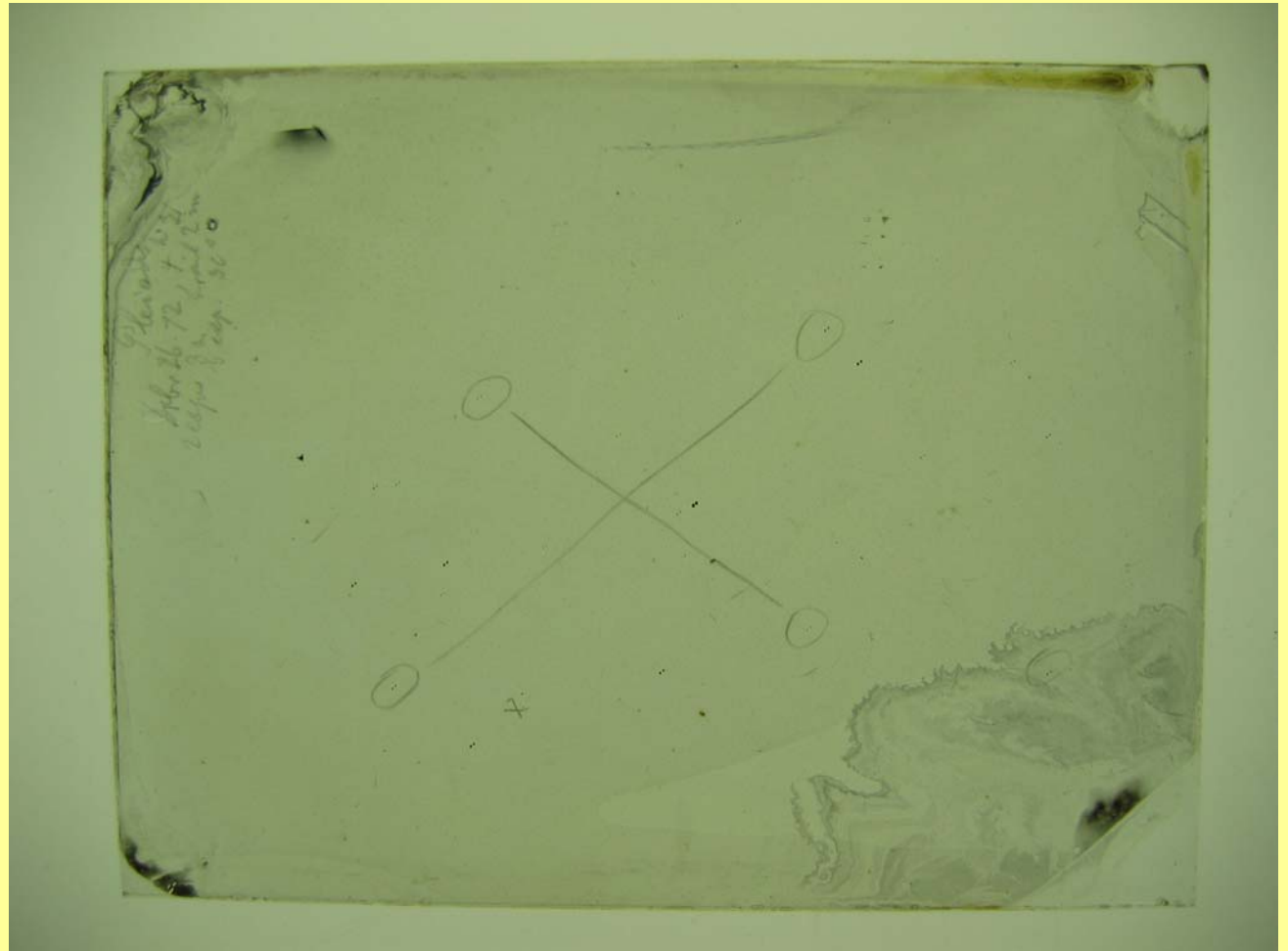
Slide after Bob Simcoe



Harvard College Observatory Historical Gould Survey

**Pleiades Gould Plate, Cordoba, 1872, Dec. 26,
04:30h**

**1000 plates
In the period
1872 - 1890**



Using technology common to semiconductor wafer and flat panel display inspection stations, a machine was built that does ultra-fast, ultra-precise digitizing.

HARVARD SCANNER

of Bob Simcoe

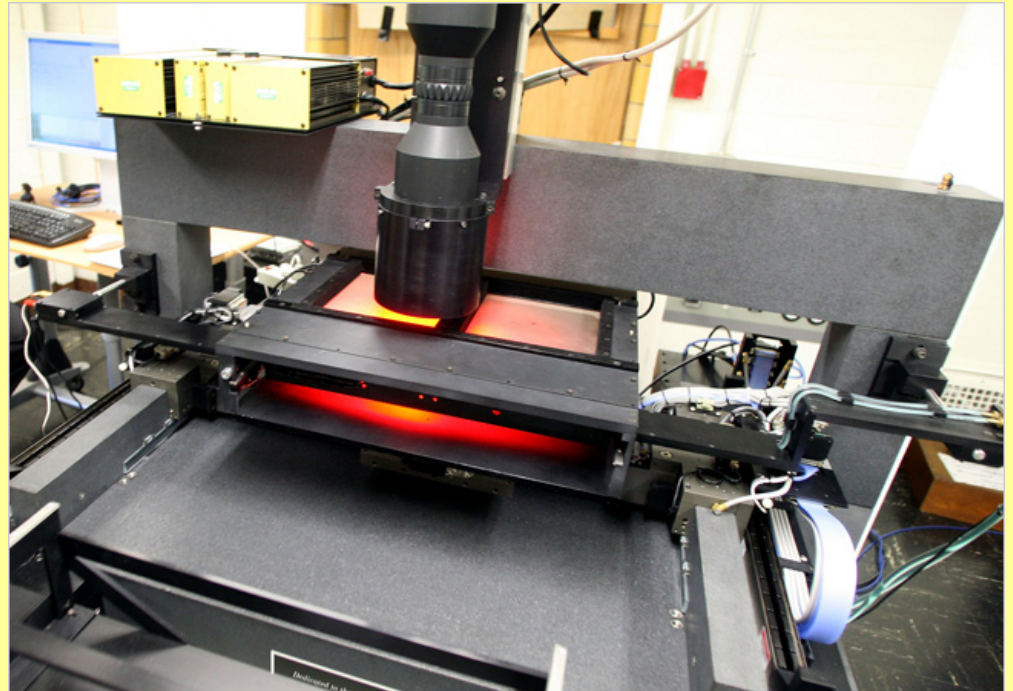
It will digitize two 8 x 10 inch plates or an 14 x 17 inch plate in about 90 seconds of machine time, generating enough data in that time to fill a DVD (2.8 Gigabytes-2 scans 14 x 17 plate).



Slide after Bob Simcoe

Digitizer Subsystems

- CCD Camera
- Lens
- X-Y (Z) table
- Isolation stand
- Illumination
- Fixture to hold plates
- Computer/storage system



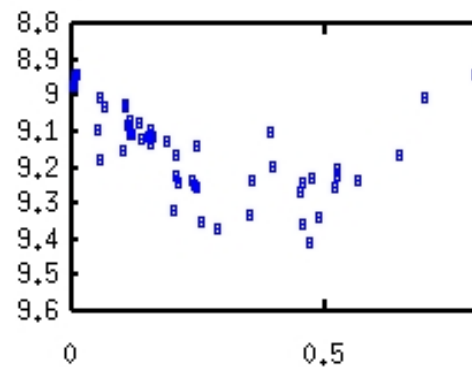
Slide after Bob Simcoe

Wide-filed plate database applications

- **Study (long term) brightness variations**
- **Study the small planet orbits: Discovery and rediscovery NEA, (DETERMINATION OF THE ORBIT OF THE LARGEST ASTEROID 2001 KX76 (d=1200 km) using the AVO (Berlin, DLR, Gerhard Hahn et al., IAU Information Bulletin, 90 p.3, 2002)**
- **study the some known phenomenon as GRB rapid events in the Galaxy etc.**
- **Link to the references Databases (IBVS, ADS**

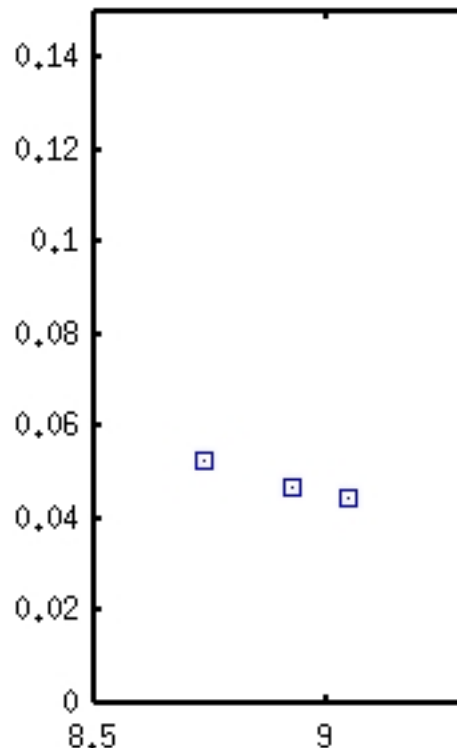
CF Oct search on the Bamberg plates: J. Innis et al., 2004 (MNRAS in press)

1966: CF Oct, usin
B mag corrected m_pg

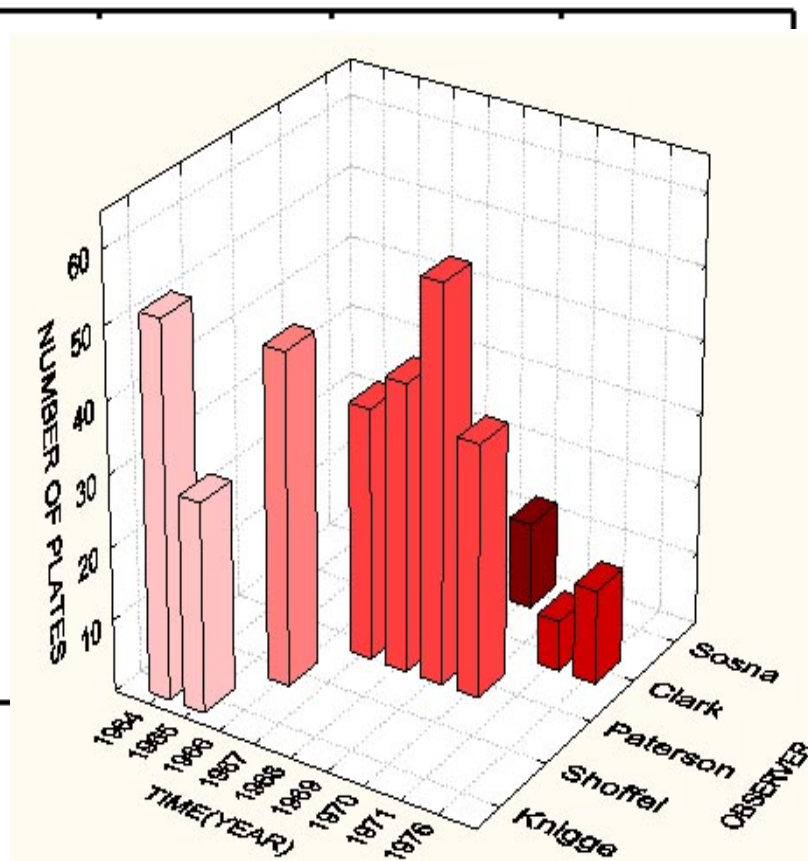
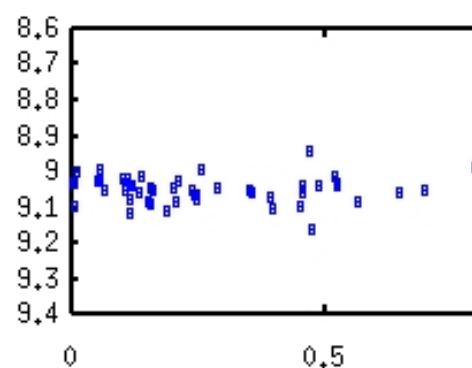


some final calibration star mags

rms mag RMS magnitude, from 1964 - 1976 data (~350 points each star)



1966: cp -80 970, us



phase

Flare Star Search in NGC7000, Asiago, 60/70 cm Schmidt; scanned with Epson 1640XL Pro, 2003.

The screenshot displays the ENVI software interface for processing astronomical data. The main window shows a grayscale image of NGC7000 with a red box highlighting a cluster of stars. A large black arrow points to this cluster. The interface includes several panels:

- #1 Scroll (0.0214):** A scrollable view of the image with a red circle and a red box.
- #1 Scroll (0.0290):** A zoomed-in view of the red box in the scroll window.
- #1 Zoom (6):** A further zoomed-in view of the stars in the red box.
- #1 Band:Band 1:NGC7000ra.fits:** The main image window with a red box and a black arrow.
- #1 Band:Band 1:NGC7000ra.fits:** A histogram window showing the input and output histograms. The input histogram has a peak at 8287, and the output histogram has a peak at 128. The current linear histogram source is Scroll (65,536 points).
- File List:** A list of files including vo_wfpdb, _Pro_D, _Pro_E_MyDoc, gasus_1, gasus_mail_022003, gasus_wfpdb, ATES_ANA_BAMBRE, ATES_ANA_SONE, PLATES_NGC7000, and CD1.

The Windows taskbar at the bottom shows the Control Panel, Nero, and the system clock at 15:20 PM.

Rosino, Tsvetkov & Tsvetkova, IBVS, 2000
Beriberi et al., Experimental Astr., 2004 (in press)

THE MAIN TASKS TO BE SOLVED ARE:

- Preservation, compression and access to wide-field astronomical observations**
- Virtual Observatory ICT standards compatibility, specially for platform independent operability**
- WEB-based search tools for stars in digitized observations**
- Adaptation of methods for image analysis, compression, web-access and data-mining**
- Dissemination among the ICT and astronomical community of the team experience**

WFPDB- towards to BGVO





ASTRO

Ogr
Nikolay
Em
Rumen

- 1)
- 2)
- 3)
- 4)
- 5)
- 6)
- 7)
- 8)



5,
3,

WFPDB LINX and mirrors

<http://vodata.aip.de/WFPDBsearch/>

<http://vo.aip.de/plates/>

<http://draco.skyarchive.org/usbdisk/www/picindex.html>

FIN