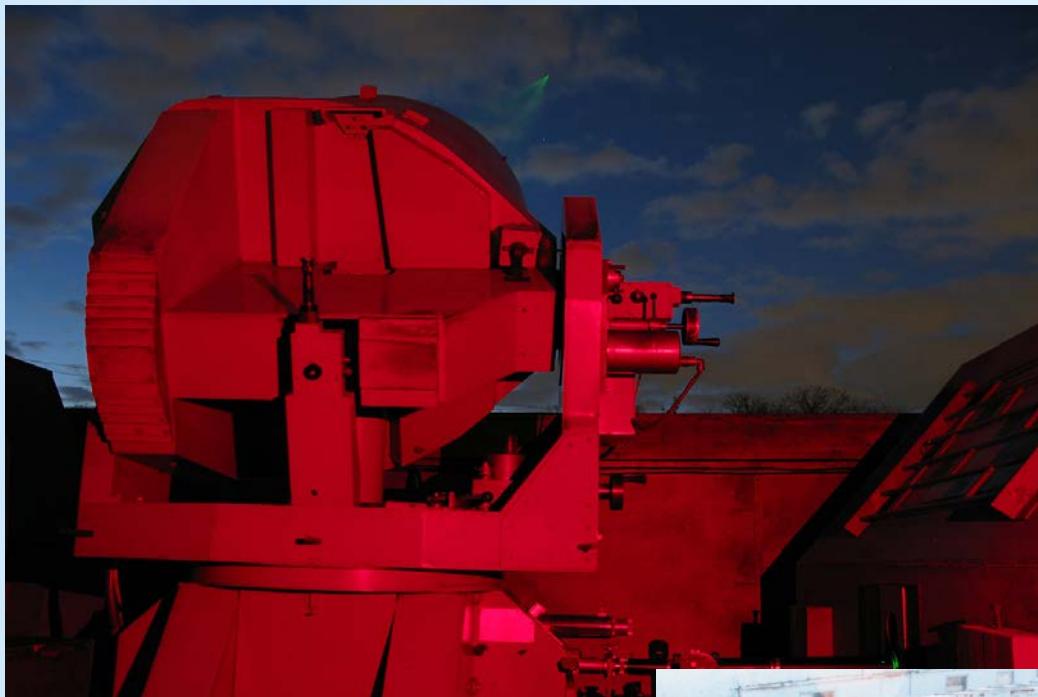


Space research in the Institute of Astronomy

Ilgmars Eglitis

Institute of Astronomy, University of Latvia; ilgmars@latnet.lv

Laser station



1 m laser telescope LS-105 at station
“1884 Rīga”,



Working as regular laser ranging station of satellite. Measuring the distances to satellite till 20000 km with accuracy about 1 cm or lower.

Working as ILRS (International Laser Rnging Service) station.

Keeps Latvians coordinate system LKS-92 zero point.

Working as independent gravimetric measurement point.

From 2016 monitoring of space debris.





Astrophysical observatory in Baldone (code 069)

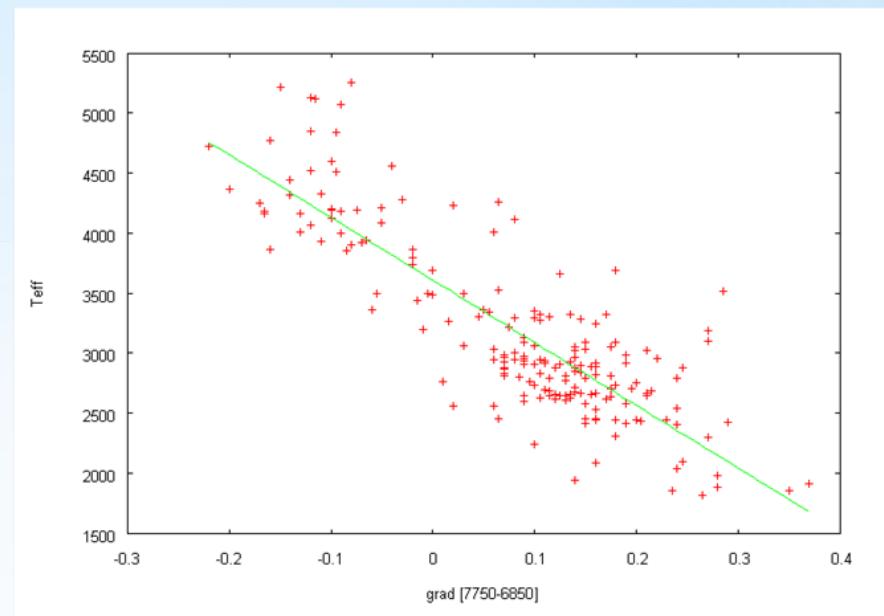
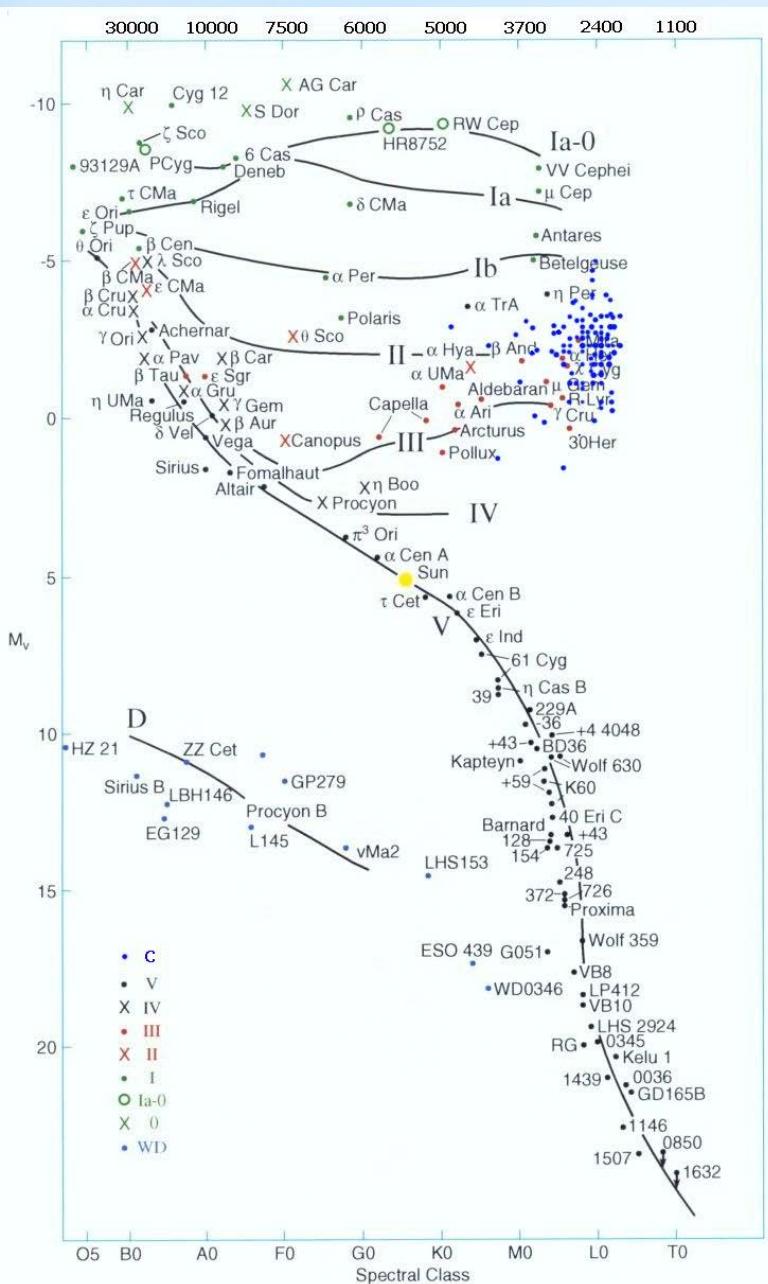
(www.baldonesobservatorija.lu.lv)

Observatory	Entrance Aperture (cm)	Year	State
Palomar	122	1947	USA
Bloemfontain	81	1950	South Africa
Hamburg-Calar Alto	80	1955	Germany
Tautenburg	134	1960	Germany
Byurakan	100	1961	Armenia
Kvistaberg	100	1964	Sweden
Baldone	80	1966	Latvia
La Silla	100	1969	ESO, Chile
Siding Spring	124	1973	Australia
Kiso	105	1974	Japan
Merida	100	1976	Venezuela
Calern	90	1976	France



Baldone Schmidt type telescope main mirror 1,2 m, entrance aperture 80 cm, focal length 240 cm. Coated in 2006 and installed by 3,2MB CCD. 4 degree objective prism, spectral resolution 500.

Low and high resolution spectroscopy of red stars, especially carbon stars.

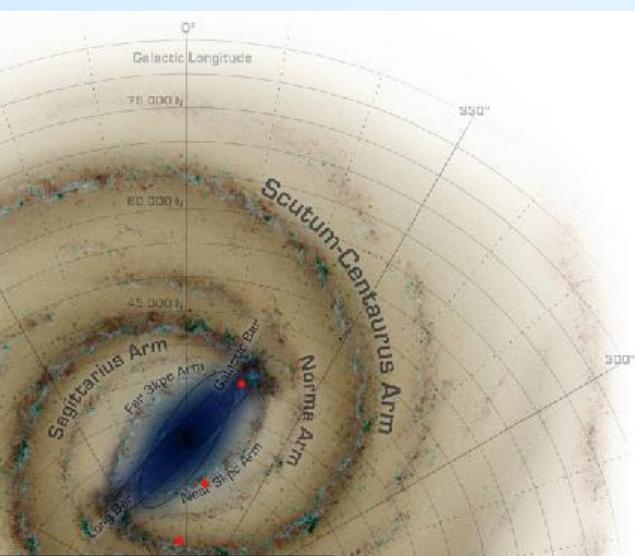
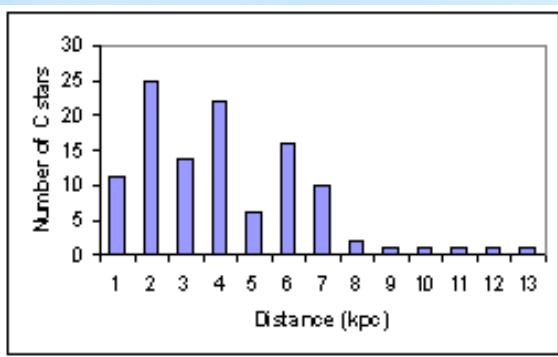


Correlation between Teff and spectrophotometric gradient discovered in Baldone observatory)

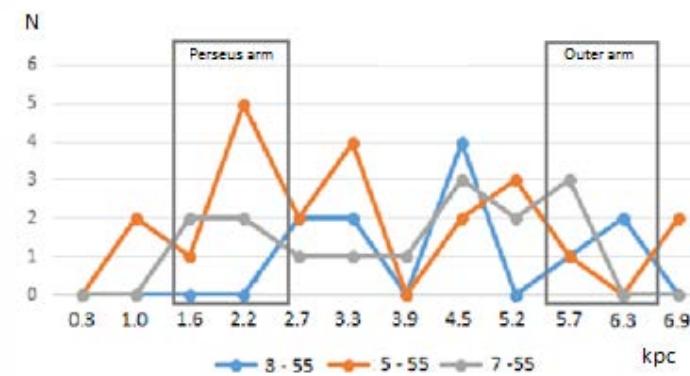
- T_{eff} of 53 newly carbon stars discovered in Astrophysical observatory (near Baldone) are obtained
 - 44 of them belong to the red subgiant and bright giant stars
 - 9 of them belong to the red supergiants



Low and high resolution spectroscopy of red stars, especially carbon stars.

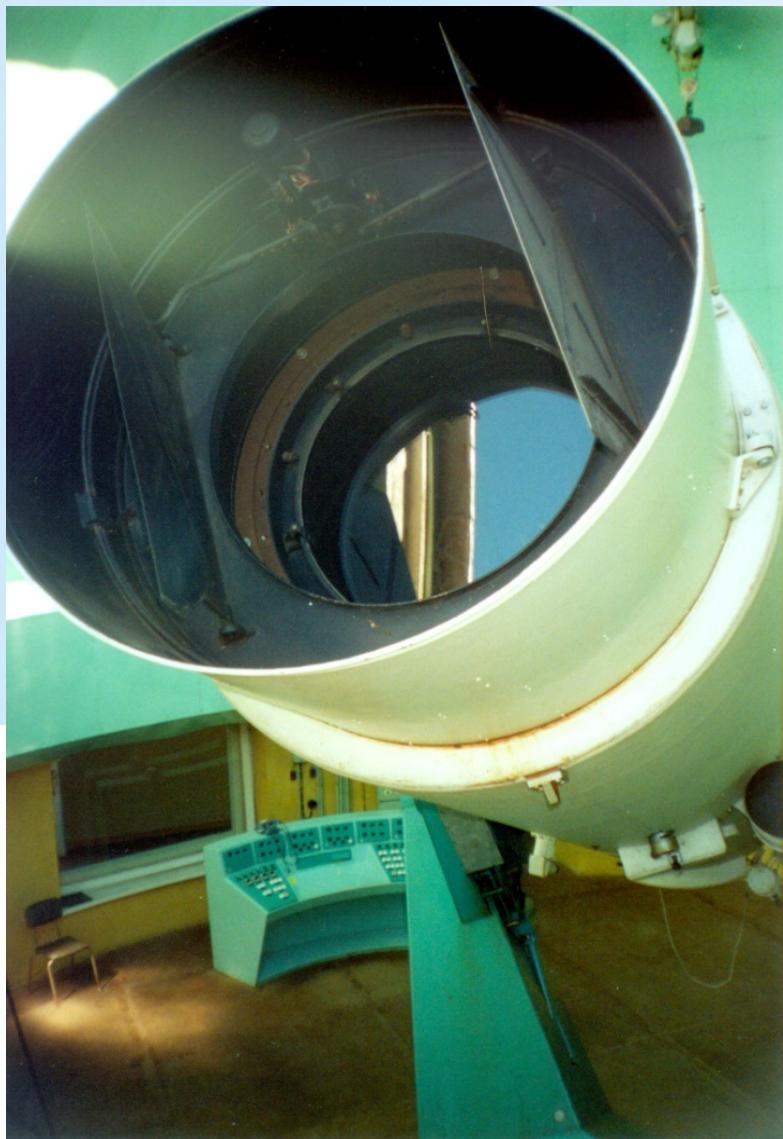


- The distances of 53 newly discovered carbon stars in Baldone were obtained
- Discovered carbon stars are weakly tied to spiral arms
- Carbon stars grouping between the arms is observed



Distribution of newly discovered stars in Baldone observatory

Study of small bodies in Solar system



Monitoring of asteroids in Main asteroid belt. Brightness limit 21 mag. There are 48 new asteroids are discovered with Baldone Schmidt telescope of Institute of Astronomy.

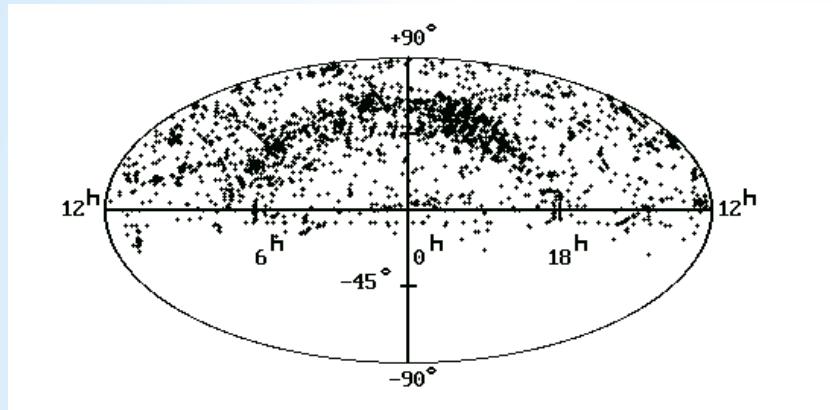
Nr.	Name	Naming year	~Diam., km
274084	Baldone	2011	1 - 2
284984	Ikaunieks	2012	1 - 2
330836	Orius	2013	30 - 60
332530	Canders	2015	1,5 - 2,5
352646	Blumbahs	2015	1 – 2
428694	Saule (Apollo-type)	2016	0,6 – 0,8

Monitoring NEO at declinations greater than 60 degrees.

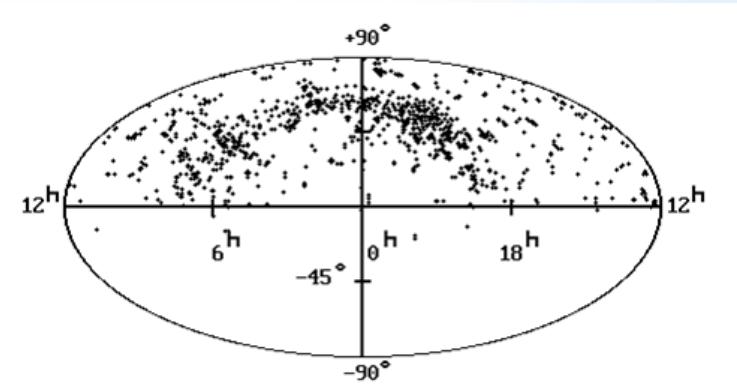
3511 astrometric positions of 826 asteroids are calculated. Average error of ephemerides 0."519.



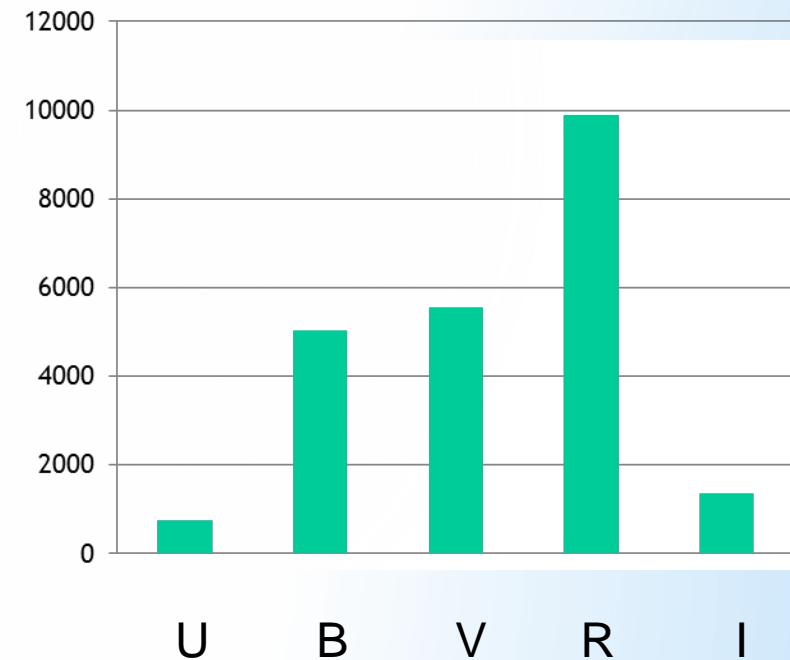
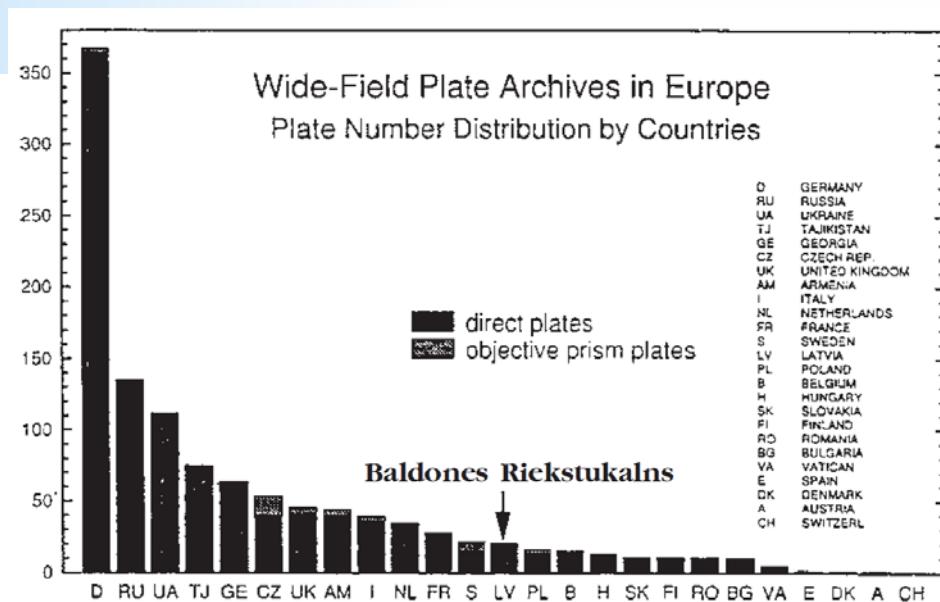
Astroplate archive 1967 - 2005



All-sky distribution of the 22000 direct observations



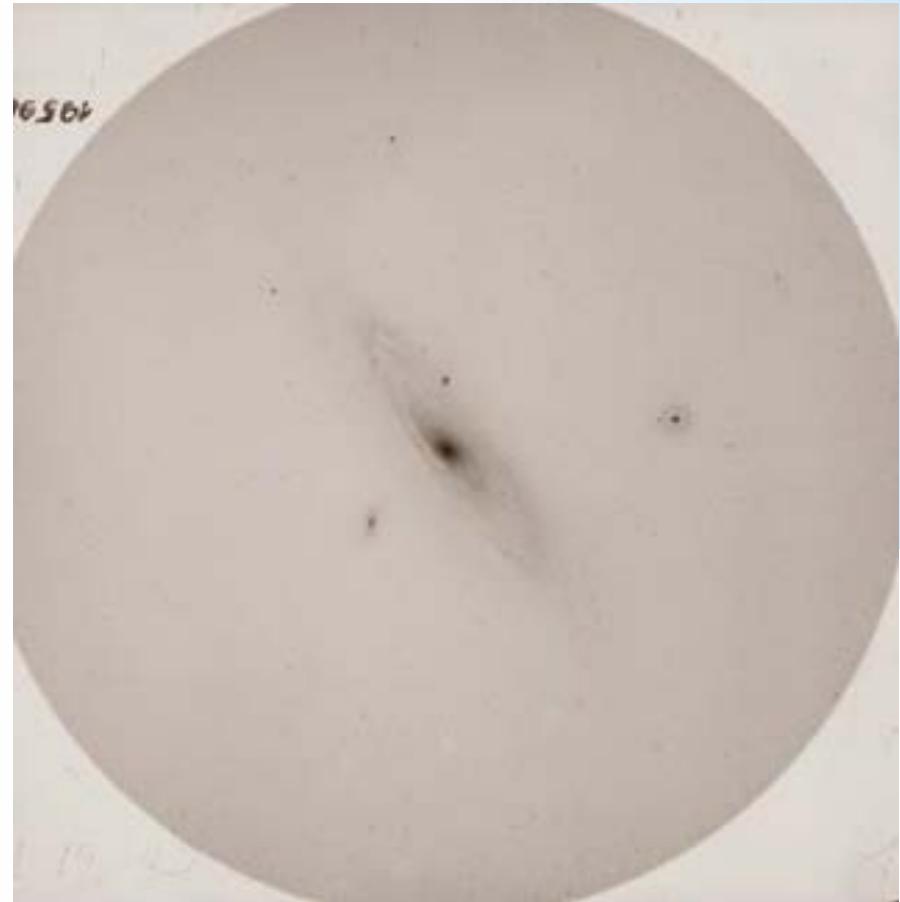
All-sky distribution of the 2300 spectral observations



From 22 000 direct plates more than 9000 were digitized in project period.
The Virtual Astronomical Observatory is in progress. The data are displaced
on server ([ftp.e-spiets.lv](ftp://e-spiets.lv)) of the Institute of Mathematics and Computer Science.



Scanner Epson Expression 10000XL



24cm x 24cm
1200 dpi 16 bit ~ 400Mb

The results of 4 scans processing

Nplates= 2492 rmsRA= .143, rmsDE= .827

Object (discovering year)	Observing UT moment	observed coord.	B	O-C
1556 Wingolfia (1942 AA)	1973-01-01 20:51:22	055435.437 +231218.651	15.51	-.17 .06
1837 Osita (1971 QZ1)	1973-01-01 20:51:22	055856.896 +241308.495	15.86	-.50 -1.15
1964 Luyten (1960 P-L)	1973-01-01 20:51:22	060210.229 +205211.523	15.81	-.57 -.22
2222 Lermontov (1977 ST1)	1973-01-01 20:51:22	055721.505 +232045.485	14.81	-.51 -.68
3008 Nojiri (1938 WA)	1973-01-01 20:51:22	055658.683 +221453.503	16.10	-.72 -1.73
4095 Ishizuchisan (1987 SG)	1973-01-01 20:51:22	060542.953 +215512.142	16.51	-.77 .14
5588 Jennabelle (1990 SW3)	1973-01-01 20:51:22	061027.128 +234945.758	16.47	.04 -2.02
5877 Toshimaihara (1990 FP)	1973-01-01 20:51:22	055151.011 +232720.324	16.63	-.04 2.92
7346 Boulanger (1993 DQ2)	1973-01-01 20:51:22	055558.049 +211841.800	16.77	.00 2.06
8260 (1984 SH)	1973-01-01 20:51:22	060916.957 +215506.721	16.98	-.33 .60
11974 Yasuhidefujita (1994 YF)	1973-01-01 20:51:00	060112.028 +214939.849	16.96	.73 .51
14221 (1999 WL)	1973-01-01 20:51:22	055455.643 +223031.625	16.47	.19 .09
15554 (2000 FH46)	1973-01-01 20:51:22	055916.685 +214255.736	17.23	-.99 .60
26629 Zahller (2000 GZ132)	1973-01-01 20:51:22	055505.199 +225921.891	17.11	.95 -.23

Nplates= 3511 rmsRA= .094, rmsDE= .089

100 Hekate (1868)	1974-03-12 21:16:54	055923.688 +204851.962	13.87	.32 -.18
1289 Kutaissi (1933 QR)	1974-03-12 21:16:54	061635.658 +213538.168	16.22	.37 -.43
1449 Virtanen (1938 DO)	1974-03-12 21:16:54	060012.752 +235304.757	16.67	.10 -.44
1560 Strattonia (1942 XB)	1974-03-12 21:16:54	061402.673 +224236.856	16.45	.73 .45
2659 Millis (1981 JX)	1974-03-12 21:16:54	060658.341 +222218.864	16.77	.41 -.18

Nplates= 15645 rmsRA= .106, rmsDE= .096

501 Urhixidur (1903 LB)	1987-03-24 19:47:30	074632.476 +400933.168	15.30	-.01 .89
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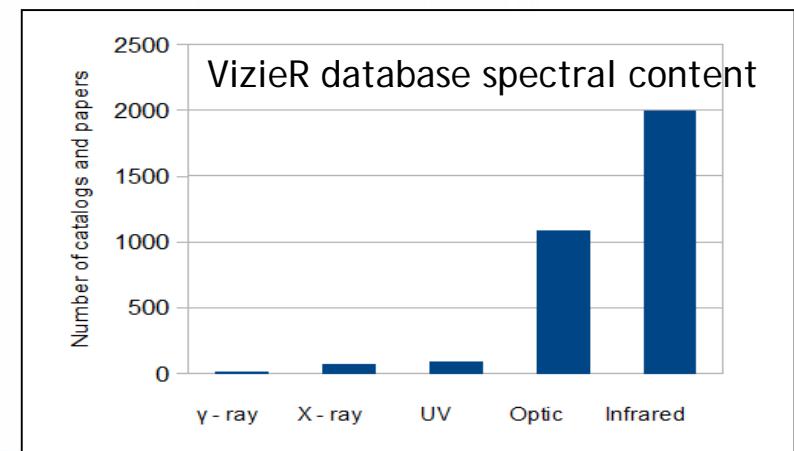
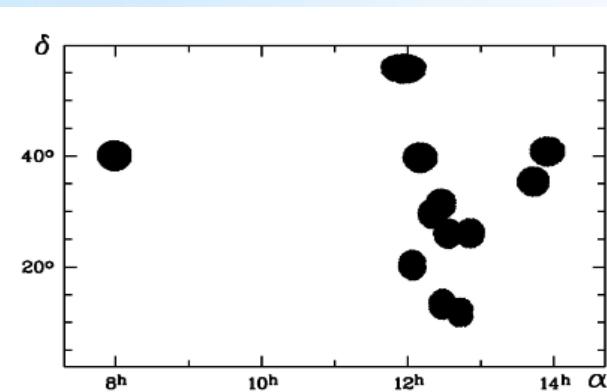
Nplates= 15677 rmsRA= .100, rmsDE= .093

501 Urhixidur (1903 LB)	1987-03-29 19:18:33	074743.384 +393027.554	15.36	-1.25 -.08
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*With red pointed asteroids observed before discovering date.

UV observations in the Baldone observatory

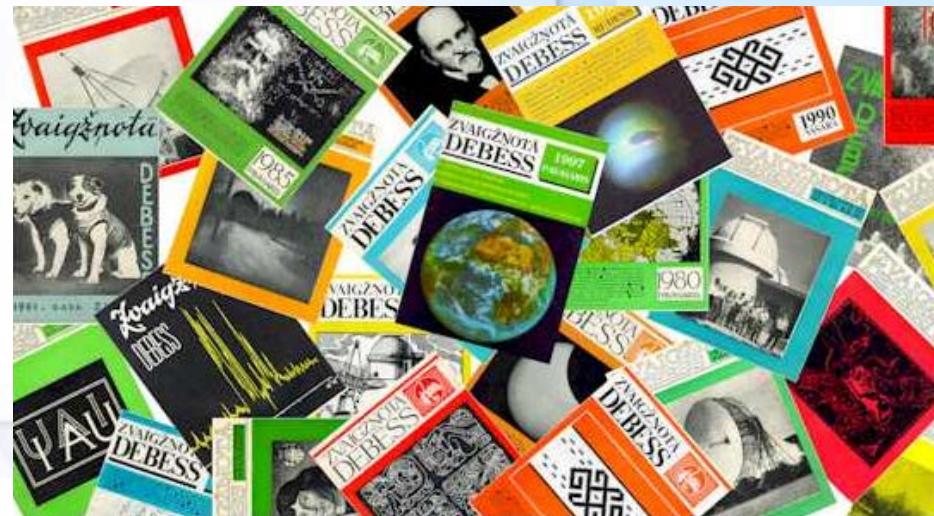
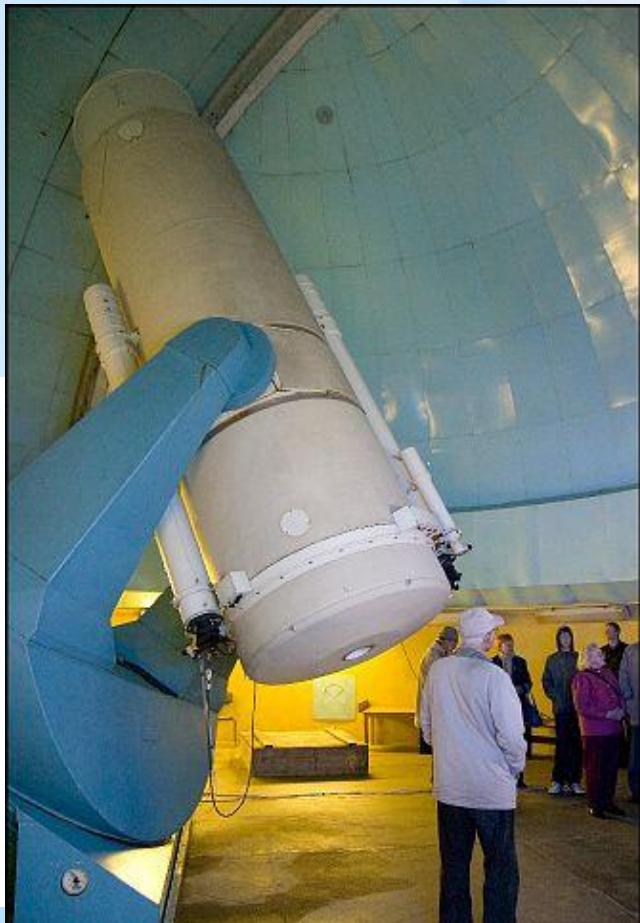
UV plates in the photographic archive at the Baldone Observatory: 753 astronegatives in 253 fields and the distribution of fields over the celestial sphere. Currently we together with Ukrainian colleagues work on this project.



Popularisation of astronomy

Important in promotion of scientific work performed by the Institute of Astronomy of Latvian University popular seasonal edition - magazine «Starry Sky».

Popular science lectures in astronomy in Baldone Observatory planetarium every year brings together around 3,000 visitors.



Thank You for attention

