

THE SOVIET-BOLIVIAN ASTRONOMICAL OBSERVATORY IN
TARIJA, PLANS AND SOME RESULTS OF INVESTIGATIONS

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The Soviet-Bolivian astronomical observatory in Tarija exists since 1982. It works on the basis of the agreement signed in 1982 between the Academy of Sciences of the USSR and the National Academy of Sciences of Bolivia.

The Observatory has 6 telescopes:

1. Expeditional astrograph, $d = 23$ cm, $f = 230$ cm, $5 \times 5^\circ$ field
2. Reflector "Zeiss-600", $d = 60$ cm, $f = 750$ cm
3. Reflector "AZT-7", $d = 20$ cm, $f = 500$ cm
4. Reflector "Mizar", $d = 11$ cm, $f = 80,5$ cm
5. Universal Photo Camera "AFU-75", $d = 21$ cm, $f = 73,6$ cm
6. Laser Range Meter "LD-3".

The works has been started for mounting the second telescope "Zeiss-600", for which now is constructing the dome with the laboratory.

The staff of the Observatory consists of 8 soviet and 5 bolivian collaborators. Since the year 1989 according to agreement signed by National Academy of Sciences of Bolivia and University "Juan Misael Saracho" of Tarija the Observatory collaborates with this University.

The Observatory carries out investigations in astrometry, astrophysics and space geodesy. Since May of 1989 the Observatory broadcasts signals of exact time for Tarija through local Radio stations "Luis de Fuentes" and "Los Andes".

ASTROMETRY. The work are carried out spreading the inertial coordinate system on a wide class of stars both bright and faint. Three large astrometric programs have been fulfilled in this field:

1. The Catalogue of precise coordinates of 200.000 southern referente stars till 11 magnitude from equator to Southern Pole was created during the years 1983-1989. On the whole more than 6000 astroplates were made on the expeditional astrograph. The expose time were 4 and 12 minutes for plates ORWO ZU-21 and ORWO ZU-1 accordingly. Plates were taken with overlapping with 2 degree for declination and 8 minutes of time for right ascension. So each star was obtained on 4 plates.

The measurings were carried out in Tarija and Pulkovo by means of "Ascorecord" measuring machines. The measurements were taken inside of 4×4 degrees of the field of the plates. The reductions of the measurements was carried out in Pulkovo by ES-1033 computer in the FK5 fundamental system on the basis of the SRS Catalogue, created by joint efforts of the Washington and Pulkovo astronomers using the results of meridian observation made at 11 Observatories of the World.

The accuracy of preliminary catalogue is $\pm 0.25''$ (1) and of the final one is $\pm 0.15''$.

2. Soon the work at Catalogue of precise positions of bright stars of southern sky till 6.05 magnitude which were not included in the list of FK4 stars will be overed. Photographic observations of bright stars were carries out using special method: the light of bright star is being decreased by means of neutral filter mounted in the center of plateholder. At the same time the stars of SRS Catalogue were observed without filter.

The expose time was 2 minutes for plate ORWO Zu-21. Each star was observed minimum twice with turn of the filter to 180 degrees. In all were received more than 4.000 astroplates. The Catalogue would be finished off in 1990.

3. The work on astrometry of equatorial stars till 12 magnitude have been started. The photographic observations were carried out with 4-fold overlapping. The expose time is 20 minutes for plates ORWO ZU-21. As a reference catalogue will be used the SRS one. Until by the 1-st of October 1989 were received 1551 astroplates that is 40% of all observational work. Now is planning to fulfil measurement by automatic machine in Pulkovo (2). The work is being to finish in 1995.

The ASTROPHYSICS WORKS are in plans of Observatory since 1987. Among of objects there are: supernova 1987 A, satellites of Mars Fobos and Deimos, Halley Comet, stars and so on.

In more detail bellow are described the star astrophysics observations. The absolute spectrophotometry of bright stars was fulfilled in visual and near infrared (310-1110 nm) range of spectrum by means of AZT-7 and Zeiss-600 telescopes with use of the SF-68M grating spectrophotometer. As a receiver the FEU-79 and FEU-83 photomultiplier tubes were used with cooling them by CO₂ gas. The results of observations were registered by small DVK-3 Computer (belonging to DEC Q-bus family). This computer also executed preliminary processing of these observations and registered on floppy disk for a further processing by greater computer.

The final reduction was made taking into consideration the atmospheric absorption by molecules of O₂ and H₂O (3). The absolutisation was produced with help of energy standard (a standard lamp) which was calibrated by State Standard at Moscow. As a result of this work will be obtained a Catalogue of absolute spectras of selected bright stars till 6 magnitude. During 1987-1989 were obtained more than 900 spectras. In the future it is planning to use Zeiss-600 telescope with the CCD spectrometer. It will allow to observe fainter stars till 10 magnitude.

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