

# AN 80-cm UNIVERSAL AZIMUTHAL TELESCOPE FOR AES OBSERVATIONS

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**ABSTRACT** Based upon altazimuthal mounting SKT 1-70 an 80-cm telescope is being built for photometric and position observations of low- and high- orbital AES. The telescope has two foci: a prime focus for panorama light detectors, and a Cassegrain focus for a photometer.

**Key words:** Artificial satellites

## Results

An 80-cm telescope for AES observations is being produced on the basis of fast cinetelescope SKT 1-70 having an altazimuthal mounting and designed for multicolour photometry, polarimetry and position observations of low orbital, high orbital and geostationary AES.

Due to the problem set it was necessary to provide maximum penetrating power at minimum focal lengths of the optical system to attain the largest nondistorted field of view. Above all, it was urgent for position observations made with the aid of panorama light detectors where alongside with AES the stellar images should be in the field of vision for coordinate references. Besides, specificity of a number of observations for example, according to the Global Star program, suggests obtaining images of several closely located AES in the same field of view.

Based upon the above requirements a proposal task was made up for manufacturing the telescope. The presence of two foci are designated: a prime one - for a panorama light detector, and a Cassegrain focus - for a multicolour photometer-polarimeter. In order to provide maximum penetrating power, the opti-

cal system should have a minimum possible diameter of the secondary mirror and minimum of correcting systems. Owing to this N.N.Fashchevsky developed an optical system incorporating one-element meniscus corrector for prime focus and Ritchey-Chretien system for Cassegrain focus which provides a maximum field without any supplementary correction optics.

Technical Performance of the Telescope is as follows:

- 1) The primary mirror diameter is 800 mm
- 2) The secondary mirror and meniscus diameter - 180 mm
- 3) The system: Ritchey-Chretien for a Cassegrain focus and meniscus corrector for prime focus
- 4) The prime focus - 2.88 m,  $A=1:3,6$ ;
- 5) Equivalent focal length of the Cassegrain - 10 m,  $A=1:12,5$
- 6) Linear corrected field of view - 30 mm

The work at different foci is carried out with an interchangeable secondary mirror. The meniscus is erected permanently, adjusted and focused with a light detector apparatus for prime focus. When the work in Cassegrain focus is to be done, the secondary mirror is set up onto the meniscus cell.

The telescope tube represents a delicate construction of the surveyer type which is mounted on a swinging platform of the set-up SKT 1-70. The tube inclination in one direction only strictly at height permitted to develop a more simplified design of the tube and primary mirror support accessories.

The telescope optics was manufactured at optic workshops, Odessa observatory, by N.N.Fashchevsky and Yu.N.Bondarenko.

The telescope tube, dome opening and dome rotation designs were developed by Yu.A.Medvedev and L.S.Paulin and manufactured at big astronomical workshops of Odessa observatory. The apparatus for registering data and telescope control is developed by R.A.Chaichuk and other researchers of OAO OSU cosmic investigation department participating in the work.

The telescope can be operated in a semiautomatic regime when guiding a moving AES with the help of two observers, one of them drives on azimuth, the other - on altitude. For this,

each work-place is supplied with a guide and a corresponding telescope monitoring system. An automatic regime of telescope operation is designated when the guiding is carried out from the AES image in a light detector with the aid of a control computer.

The telescope is being set up at astronomical station Kryzhanovka, Odessa astronomical Observatory, in a 6m-dome tower. This constitutes a whole architectural ensemble with premises for registering and control apparatus and for observational data reduction.