THE MAIN FEATURES OF THE 1.56-M TELESCOPE AND ITS STATUS QUO

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ABSTRACT. This telescope was designed for determining the trigonometric parallaxes of faint stars. The otpical configuration is a Ritchey-Chrétien system and has only a f/10 Cassegrain focus for photographic work.

The mounting is a combination of fork and yoke frame which can reduce the flexure due to gravity. A high speed digital servo-system was adopted for controlling and driving the telescope. At present some photographs of Comet Halley have been obtained.

1. OPTICAL SYSTEM

(1) Main optical system.

* Configuration: Ritchey-Chrétien system.
  Concave hyperbolic primary mirror: Diameter - 1560 mm. Thickness - 240 mm. Focal ratio - f/3.3.
  Convex hyperbolic secondary mirror: Diameter - 530 mm. Thickness - 80 mm.
* Focal ratio:f/10. Focal length:15600mm. Free coma field:± 15' or ±30'.
* Image quality: Image disc within 20' is less than 1". 85% of the light is gathered in 0".6.

(2) Both the guiding and finding telescope are refractors.
Guiding telescope: Diameter 220 mm; focal length 2860mm; field ±1°.0.
Finding telescope: Diameter 220 mm; focal length 800mm; field ±1°.5.

(3) Offset guiding system.
Offset guiding can be accomplished visually or photoelectrically. The pick-off prism (26x20 mm) can be rotated 270° around the axis of the main tube.

2. MECHANICAL ASSEMBLY

(1) Mounting
The mounting is a combination of fork and yoke frame. Its characteristics are (1) the optical axis has the minimum tilt angle resulting

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from the flexure of the mounting, (2) the polar region can be observed with the full aperture, (3) when the declination axis is above the polar axis, the visual eyepieces are very near the polar axis and (4) there are two spherical oil bearings on the end of the mounting. Thus the alignments of the azimuth and the elevation are very easy to do.

(2) Tube

The tube consists of (1) a primary mirror cell - the primary mirror is supported both in axial and lateral direction by an 18 lever counter-weight mechanical system, (2) secondary mirror cell - the secondary mirror is supported in the axial direction by evacuating the air behind the mirror and in the lateral direction by a mercury tube and (3) multiple exposure camera - for saving observing time a multiple camera is provided, which contains four plates to be used automatically one by one.

(3) Automatic focusing device

This device contains four parts: (1) Two Cervit rods used for keeping a constant distance between the back surface of the primary mirror and the vertex of the secondary mirror, (2) a slit illuminated by a light source is fixed on the upper end of one rod, (3) a thin lens is fixed onto the centre of the secondary mirror and (4) a microscope objective and a CCD are fixed onto the upper end of another rod.

The image of the slit is formed on the CCD by the thin lens and the microscope. Thus the image will move on the CCD when the tube expands. As a result, the CCD will feed a signal to drive a stepper motor which moves the secondary mirror to the optimum position.

3. CONTROL SYSTEM

(1) Drive control

A high speed D.C. motor and several resolvers constitute a digital high speed servo-system to accomplish the slewing, setting, guiding and tracking rates.

(2) Photoelectric autoguide

By reversing a prism in the offset guide component the guiding mode can be changed from visual observation to the photoelectric autoguide mode. By means of a semicircular knife disc and a photon counting technique the guiding accuracy could reach 0".2.

4. DOME BUILDING

Site - western suburb of Shanghai: Diameter - 17 m. Height to the centre of the dome - 21.7 m.

5. THE STATUS QUO

At present the telescope has been assembled and aligned and had its "first light" in November 1985 in the workshop.

It will be disassembled and transported to the new dome next year.

Our aim is to put the telescope into normal operation between the end of 1986 and early in 1987.