

Product review

Tal-1 Newtonian reflector

The £179 Russian TAL-1 Newtonian would not look out of place in a 1960s high-street camera shop. But that doesn't mean it's not a good beginner's telescope. **Martin Mobberley** did the timewarp.

The hi-tech telescope market of 2006 is a Universe apart from the world of yesteryear, where a 60mm refractor or a 100mm reflector was every young amateur's dream instrument. Nevertheless, some things never change. A beginner's telescope should be inexpensive, easy to use, rugged, and with good optics. It should also be 100% reliable and stay in perfect collimation.

With the TAL-1, made in Russia's third city of Novosibirsk, you get what you pay for and more.

Out of the box

The TAL-1 is a 110mm aperture (4.3 inch) f/7.3 Newtonian with a focal length of just over 800mm. Although an inexpensive telescope it is immediately apparent that the TAL is built to last. It comes on a sturdy GEM (i.e. a German Equatorial Mounting, with the telescope at one end of the Dec

axis and counterweights at the other) incorporating precision ball bearings. Its seamless Optical Tube Assembly (OTA) is solid, as is the pedestal mount, which incorporates vibration suppression pads. Rest assured, this telescope will not fall apart in the first few years of use. A latitude scale is provided for adjusting the polar axis but there is no polar-alignment telescope to assist. The only tricky bit during assembly was getting the latitude lock lever tight without it fouling the declination axis.

The OTA attaches to the GEM with two felt-lined metal rings and quick-release clamps. Because the OTA is so rigid and perfectly circular it can be smoothly rotated within the rings, provided they are not too tight. This feature makes the TAL-1 a joy to use at any angle. Depending where the telescope is pointed, the eyepiece height is often ideal for a standing child

(aged 10 or so) or for an adult seated on a stool.

The mounting also allows the telescope to travel in right ascension (RA) for many hours beyond the south meridian at declinations as high as +30, without having to normalize the tube (switching sides) to avoid a collision with the pedestal.

Supplied are two eyepieces (a 10mm and a 25mm Plössl) and a 2x Barlow lens, all of decent quality. These give a total choice of four magnifications: 32x, 64x, 80x, and 160x. A proper 6x30 finder scope is a welcome addition, too.

Remarkably for such a low-cost telescope, setting circles are provided for finding your way around, as well as a very handy camera bracket for piggyback deep sky photography, and a safe sun projection screen which attaches to the declination axis. An eccentric full aperture stop can limit the TAL-1 to roughly 40mm aperture for solar projection if required.

The RA setting circle is divided into 10-minute (2.5 degrees at the celestial equator) increments and the declination circle has 2-degree increments.



The TAL-1 assembled. All images: Martin Mobberley.



The rugged build standard of the TAL-1 mount is obvious. Note the clear setting circles and the various clamps and slow motion controls.

Collimating

For the first time buyer, how easily a telescope can be collimated, and whether it stays in collimation, should be one of the most fundamental considerations. Any un-collimated telescope will fail to perform at high magnification. The cells supporting the TAL's primary and secondary mirrors allow easy collimation of the optics, which will not slip during normal transportation.

For any Newtonian with an f-ratio equal or slower than about f/6 (e.g. f/6, f/7 or f/8+) collimation adjustments are achievable in daylight without necessarily having to resort to night-time star collimation. Even so, a star test is highly advisable (see *Tech talk* October 2005). At f/7.3 the TAL-1 has a large collimation sweet spot almost 9mm in diameter. So little knocks will not put it out. At a focal length of 800mm the sweet spot diameter corresponds to 0.6 degrees on the sky, i.e. a razor sharp image bigger than the Full Moon.

Under the stars

The first thing I appreciated in the dark is that the TAL-1 has some nice, dual-axis, slow-motion control wheels, easily within arm's reach, and the RA wheel can easily be used to track objects as they drift across the night sky. Both knurled wheels allow roughly ±4 degrees of telescope movement, so with the manual RA control you could track an object for half an hour if required, allowing you, with care, to take a few piggyback wide-angle photographs of constellations.

Being only 110mm in aperture, the quality of the telescope's optics was easy to test. Stars showed a perfect diffraction



At the eyepiece.

pattern for an instrument with a thin 4-vane spider and the intra and extra focal detail was almost identical, indicating a good quality mirror. Being such a small chunk of glass the mirror adjusted to the air temperature in less than 20 minutes, even though the tube is sealed at the mirror end to prevent dust settling on the mirror (an open ended design would be better from a thermal viewpoint but would let the mirror become dirty).

When the telescope arrived Mars was at its maximum 2005 diameter (20 arcseconds) and much detail was visible on the planet's surface at 160x. Saturn was a splendid sight too, with the rings' Cassini division clearly visible.

Always a beautiful sight, the double star Albireo, against the Milky Way backdrop, did not disappoint at 32x.

Conclusions

It is hard to fault any telescope that gives you pleasing views, setting circles, a proper finder, a host of accessories, and an equatorial mounting for £179 and I am really struggling to think of anything negative to say about this budget telescope. All in all, the TAL-1 is a friendly, solidly built winner and reminds me of the Russian Soyuz spacecraft: 1960s technology that just keeps on working.

Martin Mobberley has been a member of the British Astronomical Association for over 36 years, serving as President from 1997-1999. His third Springer Astronomy book, Lunar & Planetary Webcam User's Guide is due out in March.



The TAL-1's tube, focuser and finder are built to last.

At a glance

Product:	TAL-1 Newtonian Reflector
Supplier:	Optical Vision Limited Unit 2b, Woolpit Business Park, Woolpit, Bury St. Edmunds, Suffolk IP30 9UP
Web:	www.opticalvision.co.uk
Tel:	01359 244200
Price:	£179