

TONiC™ incremental encoders have star potential for Astrosysteme Austria



Customer:

Astrosysteme Austria

Industry:

Scientific, research and analysis

Challenge:

To find an automatic motion control solution for an inexpensive type of telescope mount - offering the same performance of those found only in professional observatories.

Solution:

The compact TONiC encoder provides ASA mount torque motors with significantly enhanced performance.

Overview

The digital age has led to a quantum leap in astrophotography, making even the furthest galaxies accessible to professional astronomers and observatories. Now, thanks to Astrosysteme Austria (ASA), helped by Renishaw technologies, even keen amateurs can observe and photograph these remote solar systems at an affordable price.

ASA prides itself on making research-grade telescopes for the semi-professional that incorporate the latest astrophotographic technologies available. The company consistently renders all components of the optics, mount and tracking systems to precise professional requirements. Of particular pride are their ground-breaking Astrographs, on fixed mounts with direct motion drives, that use similar tracking capability to professional observatories.

This has been made possible by employing high-resolution Renishaw encoders installed directly on the axes of the mount. Previously, even the finest astronomical mounts relying solely on mechanics couldn't solve the problems occurring during a common astronomical imaging session. And well-engineered, electronic solutions – available to professional observatories – came with a prohibitive price tag. By choosing Renishaw's



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Astrosysteme Austria, Austria

encoders, ASA reduced the expense of such state-of-the-art solutions without any compromise in performance at all.

Renishaw's TONiC incremental encoders employ sophisticated spatial filtering optics and state-of-the-art electronics which enable angular positioning to incredible accuracies. TONiC is the smallest encoder in the non-contact incremental family and also offers fine resolution to 1 nm and jitter to 0.51 nm RMS (root-mean-square). The reduced jitter and increased resolution result in an encoder that provides the ASA torque motors (direct drives with no backlash) with significantly enhanced positional stability and low-speed velocity control.

Because the TONiC encoder reads RESM rotary scale rings which are directly mounted onto the moving axes, backlash, and the effects of encoder couplings and bearing wander are eliminated. Zero mechanical hysteresis results, conferring high levels of metrology regardless of substrate material or wide temperature swings. RESM stainless-steel rings are available



ASA telescope with direct-drive mounts

in a range of standard diameters from 52 mm to 550 mm with even larger sizes available on request. The low-profile ring is ideal in direct-drive torque motor applications.

Furthermore, the level of performance that results from direct drive and encoder feedback means that the telescope has no need of additional guiding systems or adaptive optics. Now, tracking operations can instantly adjust and compensate for disruptions, including something as fleeting as a brief gust of wind. Helped by the excellent tracking accuracy of the TONiC encoder, ASA mounts begin to pay for themselves immediately and can be used in the field and in any remote-controlled operations.

“With the help of Renishaw encoder systems, ASA has also successfully applied this technology to the semi-professional market, bringing extremely precise and affordable equipment to the world of amateur astronomy and astrophotography. The professional market has benefited from our innovation in sustaining this precision at a much better cost. The pointing precision of our systems reach ± 3 arc seconds over the whole night sky. The tracking precision at 0.24 arc seconds RMS is sufficient to make extra guiding equipment and corrections obsolete. Renishaw encoders have been used in all our mount systems from the beginning”, says owner and Managing Director of ASA, Egon Döberl.



TONiC encoder with RESM scale

Summary

Astrosysteme Austria has developed direct drive telescope mounts that offer similar tracking performance to that used by professional observatories but at an accessible price for keen amateur astronomers. The mounts incorporate Renishaw's TONiC angle encoders to control positioning accuracy down to an incredible 0.2 arc seconds.

For more information visit:

www.renishaw.com/astrosysteme

www.renishaw.com/encoders

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