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more about the
RAPTOR® SCOPE



Klaus Eckerl, CEO and
founder of IBE Optics,
and **Winnie Heun**, director
of photography, give the lowdown on
the key features of the **RAPTOR® SCOPE**
and what makes it stand out in the market.

DYNAMIC VISION

How does one come up with the idea to
build something like a SCOPE?



Klaus Eckerl (KE): Back in 2004 Wolfgang Weigel came to me and then we first considered designing a scope for the 3CCD ENG broadcast cameras.

The inspiration came from older scopes of the early '80s and '90s, such as the T-Rex. I agreed, but said we'd do it as partners and finance it ourselves. Unfortunately the launch of the so called HD-SCOPE at NAB 2006 coincided with RED disrupting the professional camera market with its first digital cinema camera. The product didn't sell particularly well.

Nearly 20 years later I revisited this old SCOPE and the idea began to take shape – building a modern version of the scope for the now prevalent full-frame format.



Winnie Heun (WH): When I met Klaus at Camerimage I had already used his RAPTOR® Macro lenses many times on my tabletop shoots. We started talking about probe lenses. I use these systems (T-Rex, Optex Excellence, Century 2000, and others) on almost every

shoot. However, they are quite old now and there is definitely a need for a new probe lens. And if it covers full-frame, it becomes extremely interesting.

What makes the RAPTOR® SCOPE special?

KE: The "old" scopes were slow, large and heavy. The T-Rex, for instance, was about a metre long and had a T-stop of 11. The older scope designs were mostly driven by clever mechanical



engineers like Wolfgang, who weren't optical designers. They had to rely on off-the-shelf components, were resourceful and experimented with different groups of optics to meet the task as best they could. I still hold these people in high regard

today – they approached things pragmatically and boldly, created real tools that gave filmmakers new ways to express themselves.

So the new Scope is a system optimized with newest software tools for the bigger fullframe sensors 44 mm and much more transmission, TStop 5,6 (FF) or TStop 4 (S35) and way smaller with less weight than ever before.

What exactly is a Scope?

KE: A scope is what's known as a relay lens system – a system that captures the image from a front lens and relays it to the sensor inside the camera. But it does more than that – the goal is to manipulate the optical path to

achieve creative possibilities that wouldn't be possible otherwise.

The front optics are typically wide-angle or endoscopic, and therefore very small – to reach areas that would otherwise be inaccessible. In the tabletop world, where one works with very small objects, you need systems that allow the camera to get really close. But cameras, with all their accessories, are large. So it's beneficial to keep the camera body away and use a flexible snorkel to reach into tight spaces.

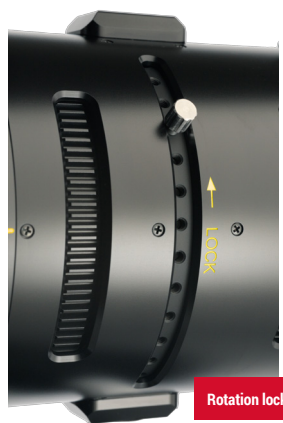


RAPTOR® SCOPE lenses

WH: Keeping the camera out of the danger zone is a great idea. Often, we shoot with liquids, fire, or intense heat. Sets are usually crammed with lighting, grip, SFX gear – sometimes even the food stylist struggles to access the product. A scope creates more space and also protects the camera. And I must say, the Scope has a durable and long-lasting robust mechanical design. That helps a lot!

KE: To freely position the image and object on all axes the scope offers rotation around the optical axis, vertical tilt (relative to the table surface), pan and horizontal tilt.

WH: I love that freedom – you only move the camera when absolutely necessary.



Rotation lock



What's unique about the RAPTOR® SCOPE?

KE: Other Scopes in the market allow horizon correction, but only in fixed positions – you have to lock in a fixed pan angle and adjust accordingly.

The RAPTOR® SCOPE, on the other hand, offers dynamic image orientation correction. You can either link or unlink it, depending on your needs.

This is achieved via a gearbox that couples the pan movement with a de-rotation group. The principle is detailed in US Patent No.US 6,259,563 B1.

A clutch allows you to engage or disengage the correction group.

WH: The image rotation lock is an extremely cool feature. The horizon tilting during panning is often unwanted, and now you can simply lock the horizon with a pin. Perfect. And all the axes of the scope can be motorised – perfect for motion control!

KE: If you want to dive into a bouquet of flowers, for example, you'd have to come in from above or below at an angle, with some pan. Doing this causes the resulting image on the sensor to rotate out of horizontal alignment. So working with a scope always presents the challenge of keeping the horizon level – and dynamically adjusting during camera moves.



RAPTOR® SCOPE under test (Credit: ©IBE)

KE: One main task developing the RAPTOR® SCOPE was to improve light transmission and image clarity. In a common endoscopic design the image is transmitted through long rod lenses, image plane by image plane. This leads to low apertures and significant absorption.

The RAPTOR® SCOPE was designed to minimise these losses.

WH: I often shoot in high-speed, and fast lenses are essential to stay within lighting budgets. Having a probe like this on set – with so many adjustment options and such a great T-stop 4 (S35) – is a total game changer.

KE: The new scope is remarkably compact – the system is modular; once you've spent a few minutes using it, it becomes intuitive:

Closest to the camera is the focus and iris control. A bit further up is the image rotation control with the clutch lever. Then comes the tilt lock around the optical axis. And right at the front, the lens mount.

You can use almost any lens via interchangeable mounts – PL, LPL or M-Mount. Just make sure the lens is set



A scope is what's known as a relay lens system – it captures the image from a front lens and relays it to the sensor inside the camera (Credit: Winnie Heun)

to infinity and the aperture is wide open. Then you set the working aperture and focus directly on the scope.

WH: You can even attach PL lenses – and still achieve macro shots. This is great for keeping the look of a project consistent. So you can shoot life action scenes with vintage lenses – and use the same lenses for macro shots with the RAPTOR® Scope.

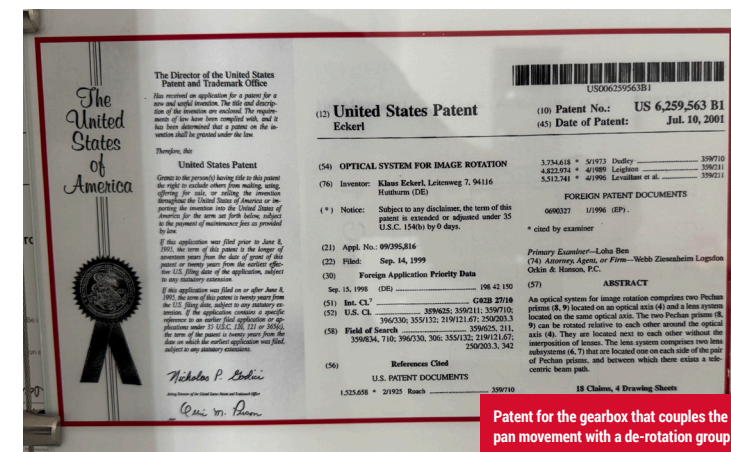
KE: Over the next few weeks, we'll be releasing lots of new accessories as a long endoscope, a zoom group in the scope and more.

WH: We haven't even talked about the rotation axis yet – it's the best and most precisely centred one I've seen on a probe system. The rotation (motorizable) now allows for endless 360° image spins at high speed – even during high-speed shoots. And all that without moving the camera.

KE: Yes, the tolerances on the components, the prisms are in arc seconds and the assembly needs lot of evaluation. ■



Alignment of the RAPTOR® SCOPE's rotation axis during testing (Credit: © IBE)



Patent for the gearbox that couples the pan movement with a de-rotation group