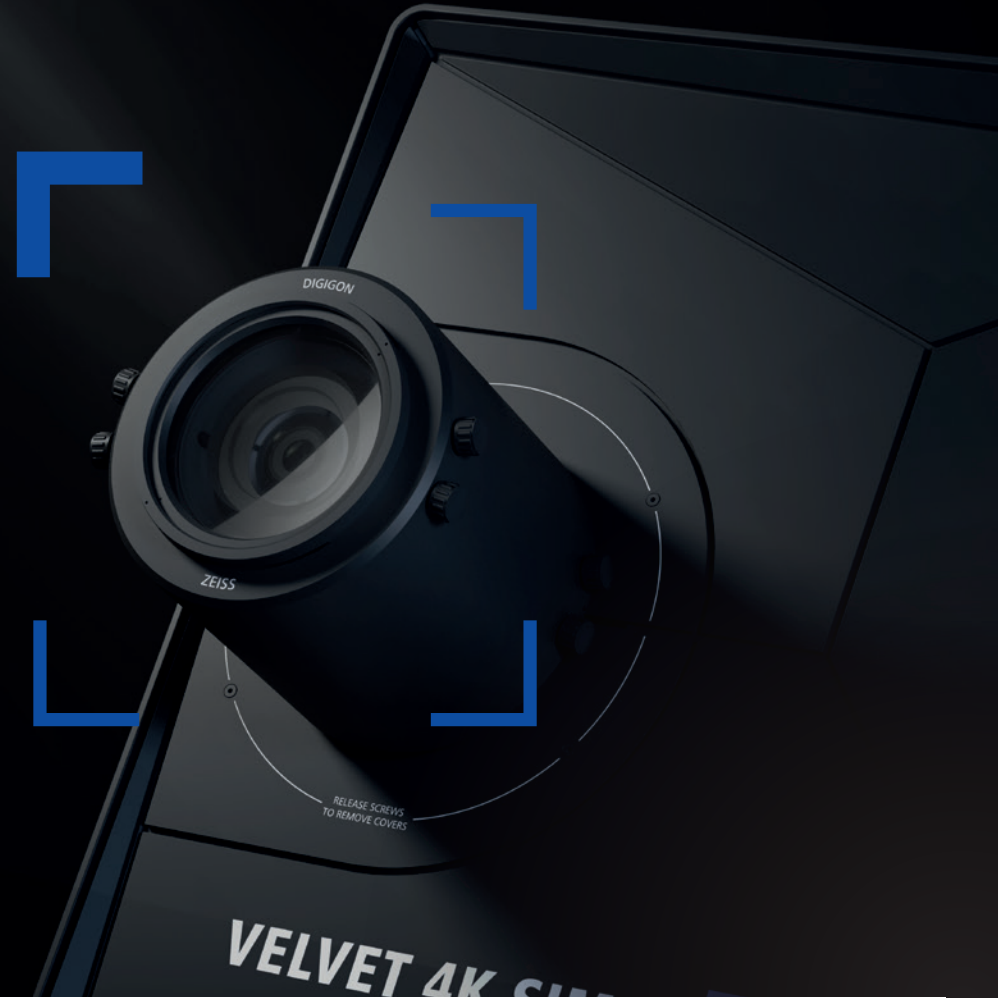


Discover the most realistic solution for visual systems



ZEISS VELVET 4K SIM
The ultimate projector

zeiss.com



Seeing beyond

ZEISS presents

the Next Level of Simulation

VELVET 4K SIM

Native Contrast 5,000,000 : 1

VELVET 4K SIM reaches an unrivaled native contrast ratio of 5,000,000 : 1 which guarantees perception of a black image background completely devoid of light.

This unique property and the additional use of a NIR light source makes the VELVET 4K SIM the perfect projection solution for high-quality simulation and training applications for both out-of-the-window (OTW) and direct Night Vision Goggles (NVG) stimulation. Scenes depicting the night, twilight, and dark content are exhibited in a manner that accurately reflects reality. There is no gray background to interfere with the scenes.

At the same time, the increased native contrast ensures sharp and distinct pixels on the screen even with the fourfold resolution (real 4K). This makes the projected content look significantly crisper when compared to other projectors.

In addition, the brightness can be graded and displayed down to the lowest gray levels with the greatest possible accuracy. The brightness resolution that can be displayed on the screen uses 10 bits for each color. The benefits are smoother gradients and perfect transition between channels in a multi-channel

projection system without the need for mechanical or optical blend masks.

With the rendition of the color gamut of up to BT.2020, the ZEISS VELVET SIM 4K provides an extended color accuracy that takes the viewing experience to a new level. BT.2020 defines a significantly higher chrominance and color saturation than older standards.

VELVET 4K SIM is capable of displaying video signals with a frame rate up to 240Hz. This new technology allows for artifact-free, fast moving image content without smearing or motion blur.



Revolutionary benefits of ZEISS VELVET 4K SIM

1. Native contrast 5,000,000 : 1

VELVET 4K SIM enables projection of a completely black image background without disturbing residual light. With a native contrast of 5,000,000 : 1, the highest on the projector market, there is no gray background to interfere with the image content. Minute details that would otherwise disappear are clearly visible. This allows the system to perfectly replicate reality.

2. 10 bit color depth

Regardless of the input signal, the video signal in the projector is calculated in 10 bit color depth, using 1024 instead of only 256 grey levels. This avoids 8 bit artifacts across the entire display. Dawn and dusk scenarios are rendered realistically, as artifacts in color gradients are eliminated.

3. Pure electronic blending

The extremely high native contrast of the VELVET in combination with the 10 bit color depth creates artifact-free blending areas between the projection channels. The channel transitions normally visible in dark images are a thing of the past. The need for constructing mechanical or optical blend masks in front of the lens exit, which are prone to interference, is eliminated. Nothing stands in the way of total immersion in the simulation.

Current state of the art



VELVET 4K SIM



4. Optimal gray gradation

The brightness can be graduated and displayed down to the lowest gray level with the greatest possible accuracy, ensuring an optimal gray gradation over the entire brightness range. From pristine white to the darkest grayscale, colors can be reproduced true to life. Thus, the finest differences in brightness become perceptible during night simulation. VELVET 4K SIM thus guarantees a total immersion into the projected image content.

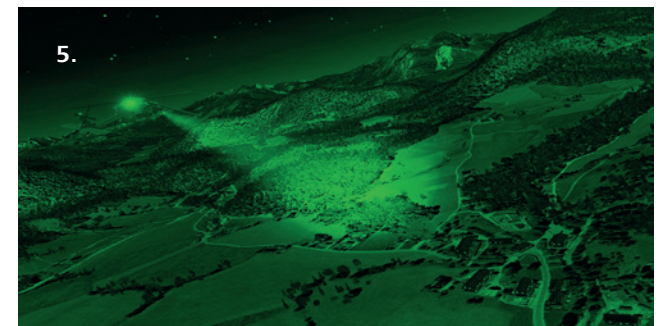
5. Night Vision training capability

VELVET 4K SIM allows a direct stimulation of real Night Vision Goggles (NVG) with near-infrared light. In combination with the extremely high native contrast, a night vision training simulation of unmatched quality is achieved.

Current state of the art



VELVET 4K SIM



Premium Standards of VELVET 4K SIM



Guaranteed repair service
for at least 15 years.



High frame rate
of 240Hz @ 4K.



The VELVET 4K SIM
projector is completely
maintenance-free.



Compatibility with a motion
system: VELVET 4K SIM
projectors can be used on a
motion platform.

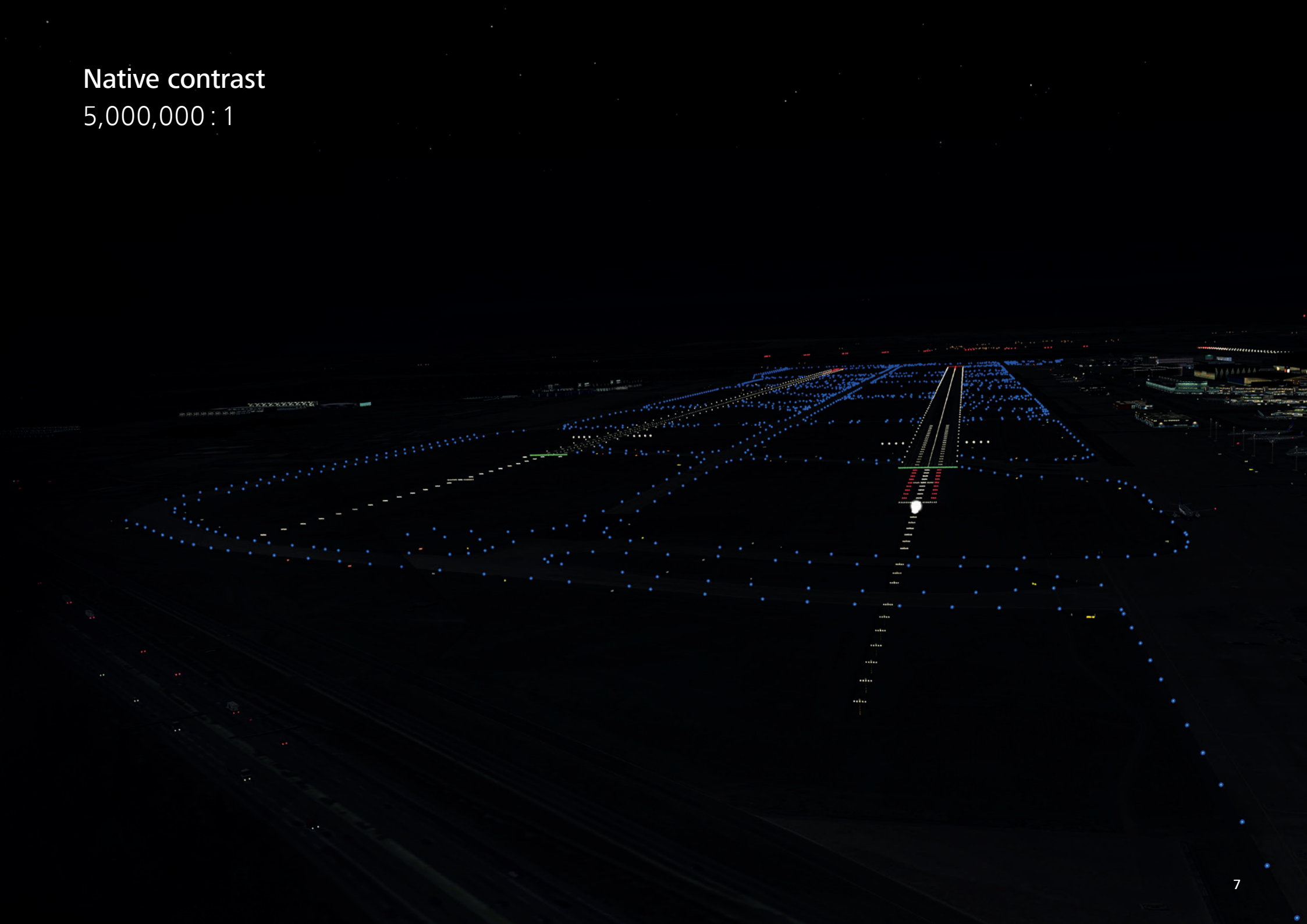


Maintainability:
Subcomponents are easy
to replace in case of repair.



Wide color space.

Native contrast
5,000,000 : 1



Experience night vision training like never before with VELVET 4K SIM

The night vision (NVIS) display on the VELVET 4K SIM is of unprecedented quality due to the projector's outstanding features.

Using the infrared spectrum for projection display allows for full night vision training capability – important for low-light or nighttime conditions. Infrared light is not visible to the human eye, but it can be detected by real Night Vision Goggles (NVG). As the VELVET 4K SIM projector emits no residual light, there is no black level disturbing the near-infrared (NIR) – frame. Real Night Vision Goggles (NVG) are stimulated just like in actual nighttime operating conditions.

Pure NVG training without any VIS signal is possible thanks to the extremely high contrast, enabling the simulated training of flight missions in complete darkness. With VELVET 4K SIM, you can display two different sets of image content simultaneously, one in visible spectrum, and the other in the near-infrared spectrum. Therefore, effects that are only visible with NVG and not with the naked eye can be rendered. VELVET 4K SIM takes night vision training to a whole new level!





NVIS with NVG

OTW

Visual systems for simulation

Design, manufacture, and installation from a single supplier

ZEISS develops, sells, and installs projection solutions with VELVET 4K SIM projectors. Its merits are appreciated by pilots trained in flight simulators as well as virtual reality and event audiences. ZEISS continues to evolve its VELVET technology. As the manufacturer of VELVET 4K SIM projection systems, we can guarantee after-sales service far into the future, providing long-term protection for your investment.



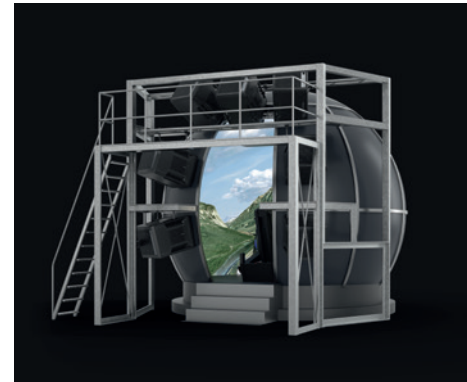
Design

Our experienced system designers and engineers use powerful tools to design the system and calculate the projection before production begins. That way, challenges can be identified and addressed at an early stage.



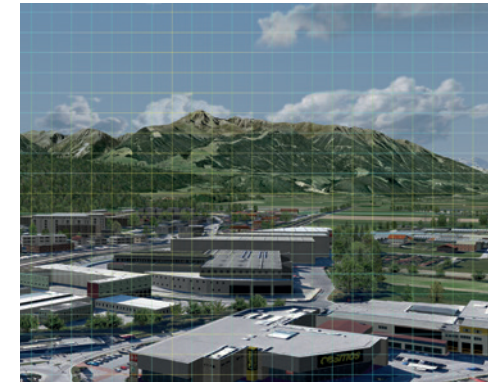
Planning

We offer to plan and implement your project in compliance with legal and official requirements. We can also offer you an upgrade to our technology in existing systems. We choose from our strong network of partners and technology providers to create customized solutions that meet customers' needs.



Installation

We offer to set-up your simulator solution. We provide advice on the selection of equipment, while meeting all structural, static, and safety regulations. We design supporting structures for projectors, screens, and accessories.



Auto-Alignment system for image geometry, color, and brightness

We offer to configure and install a camera-based automatic alignment system for image geometry adjustment as well as training for technicians on its use. Our projectors have a full-featured software suite to automatically adjust color and brightness across the entire projection. Just one person can quickly and easily conduct auto-alignment.

Technical data and specifications

Native Image resolution	4096 x 2160 (4K DCI) 3840 x 2160 (4K UHD)
Display technology	0.98" 4K Digital Micromirror Device (DMD™ by Texas Instruments) ZEISS True Black Projection Technology
Luminous flux	Up to 3500 lumens
Contrast ratio, static (on/off)	5,000,000 : 1
Color depth	30 bit RGB
Color gamut	Rec. 2020
	DCI-P3
	Rec. 709
Smearing reduction	Motion mode with 30% darktime insertion
Blending	internal 10 bit blending engine
Illumination system	True RGB solid state laser
Illumination lifetime	50.000 hours (30% brightness loss)
IR light source	10 mW @ 735 nm
Inputs	4x DisplayPort v1.4, 60 Hz - 240 Hz operation Upscaling capabilities up to native resolution
Operating voltage	100 – 240V AC, 50-60 Hz
Power consumption	max. 900 VA (normal operation)
Control interface	RJ45 TCP/IP 100/1000 network
Size WxHxD	500 x 500 x 680 mm
Weight	50 kg (without lens)
Mounting options	Orientation free, no limitation
Motion-based applications	Motion system compatible
Noise level	max. 55 dB @ 25°C
CE, CSA conformity	Yes
Safety	IEC 55032, IEC 61000-6-2, IEC 55035
	IEC 60825-1 (class 1), IEC 62471-5 (RG-2)

Lens Types	DIGIGON lens series (designed for dome projection)	
	VELVET Zx - lens series with motorized zoom/focus	
	Throw ratio @ 4K DCI	
	DIGIGON 28-53	1.11 – 2.26 : 1
	DIGIGON 50-72.5	0.66 – 1.18 : 1
	Z1	0.61 – 0.80 : 1
	Z2	0.98 – 1.35 : 1
	Z3	1.35 – 1.90 : 1
	Z4	1.90 – 2.90 : 1
Operating temperature	15°C – 30°C (59°F – 86°F)	
Operating humidity	20% – 70%, noncondensing	
Storage & shipping temperature	-10° C – +55° C (14°F – 131°F) (within VELVET shipping box)	
Repair service	Guaranteed repair service for at least 15 years	
Standard Warranty	2 years	



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