

ZEISS VELVET 1600 Sim

Delivering exceptional projection quality



Delivering exceptional contrast for simulation applications.

ZEISS VELVET



The perfect projection technique for simulation and training applications

Display systems used for simulations used to be less than optimum: in dimmed scenes the contrast was very poor and hardly any details were noticeable in the mistygray background. In dark scenes the supposedly black image background actually appeared gray, and the brilliant projection of the starry sky was far from ideal.

Even in the age of digital projection, the problem of the brightened background unfortunately still persists. However, now there is a better solution: the ZEISS VELVET projector.



The ZEISS VELVET projector delivers an absolute black image background. This unique property, makes the ZEISS VELVET system the perfect projection solution for high-quality simulation and training applications. On the one hand, night scenes or dark scenes / dawn content appear very realistic, because there is no black level. On the other hand, the high native contrast creates sharp and distinct pixels on the screen. This causes the projected content to look significantly crisper as compared with other projectors providing comparable pixel solutions.

Furthermore, the brightness can be graduated and displayed down to the lowest gray levels with the greatest possible accuracy. The brightness resolution displayable on the screen is 10 bits for each color, which also allows for a perfect transition from one channel to the other in the blending zones of a multichannel projection system. ZEISS is known worldwide as the company which develops and produces high quality optical systems with unique properties.

The ZEISS VELVET optical system demonstrates the full range of ZEISS innovation:

- Featuring a native contrast of 2.5 million : 1 – the highest in the world – as well as the aberration- and distortion-free ZEISS DIGIGON projection lenses, ZEISS VELVET projectors offer the greatest-possible definition, clearly defined pixels and optimum image resolution. This enables the system to replicate reality perfectly.
- An additional special feature is the 10-bit color resolution for every color on the screen. This ensures the best-possible transition between the channels, preventing artifacts.
- The ZEISS VELEVET system also makes it possible to display minimum grayscale with maximum precision.



Enjoy unparalleled realism with the VELVET 1600 SIM projector thanks to its unique properties – no matter the weather conditions or time of day.



Additional ZEISS VELVET benefits:

- Low maintenance – bulbs must only be replaced every 2,500 h
- Modular setup: it is possible to upgrade to infrared projection as well as to other light sources (LED, laser) by re-using the major parts of the lamp projector
- Compatibility with a motion system: ZEISS VELVET projector components can be stressed with an acceleration load of up to 3 g
- Motion Mode 1 / 2: two additional modes, adjustable by the user, means even sharper definition with very fast-moving images
- Color stability and homogeneity for many years
- No vignetting at the edges of the projection
- No annoying stray light in the projector and the lens system
- No light leaking from any part of the projector housing
- Low noise thanks to efficient ventilation
- Quick and easy lamp change
- Maintenance service guaranteed for at least 15 years
- No mechanical light shades necessary for edge-blending between several channels, because of an extremely low black level

Due to an on/off contrast of 2,500,000 : 1, a pilot has the feeling of full immersion in night flight scenes.



High image definition and stability thanks to DLP chip technology

Our sensory perception is largely affected by what our eyes actually see. Pale or blurred full-dome projections, visible blending zones, and brightness and color differences between the channels detract from our experience of looking at realistic imagery and draw the viewer's attention away from the projected content – much to the disappointment of simulation training participants.

With VELVET projectors, ZEISS offers its customers projection quality that is visibly superior to that of commercial projectors. Simulation applications with ZEISS VELVET projectors meet the users' expectations for modern and realistic virtual reality.



The proprietary »True Black Pro-jection Technology« developed by ZEISS is based on DMDTM imagers from Texas Instruments. DLP® technology offers decisive advantages over other video technologies. Arguably the greatest benefit is that the image remains stable for many years. Unlike other technologies, where images suffer losses in color saturation and homogeneity after a few thousand

operating hours, ZEISS VELVET lets you and your audience enjoy the imagery for a long time to come. Thanks to many technical and structural solutions, our projectors are designed to have a service life of 15 years or longer, with operating expenses that are comparatively much lower than with competitors' systems.

With the IR - version of the ZEISS VELVET projector, both visual and night vision scenes can be displayed.

A lens for a perfect image



ZEISS DIGIGON VELVET zoom optical lens

Design, manufacturing and installation from a single supplier

The VELVET is a mature, tried-and-tested product. Its merits are appreciated by pilots trained in flight simulators, but also by virtual reality and event audiences. ZEISS continues to evolve ZEISS VELVET technology.

As designers and manufacturers of the ZEISS VELVET system, we can guarantee after-sales service until far into the future, providing long-term protection for your investment.

However, this does not apply to projectors made by third-party suppliers. ZEISS also sells and installs projection solutions with ZEISS VELVET projectors.

The lens you need to complete the picture

The best chip and projection technology will not create an excellent image on the dome unless it comes with an outstanding projection lens.

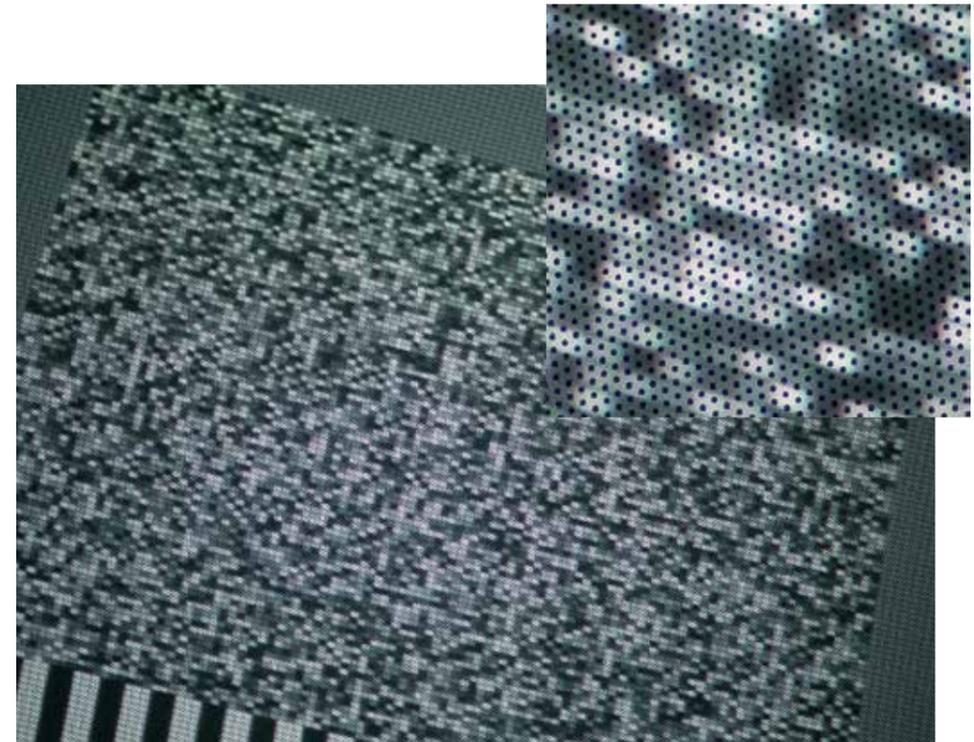
ZEISS VELVET projectors come with high-performance lenses from the ZEISS DIGIGON series.

Their ray tracing has been specially designed for dome projection, and these products impress with their higher-than-average imaging quality.

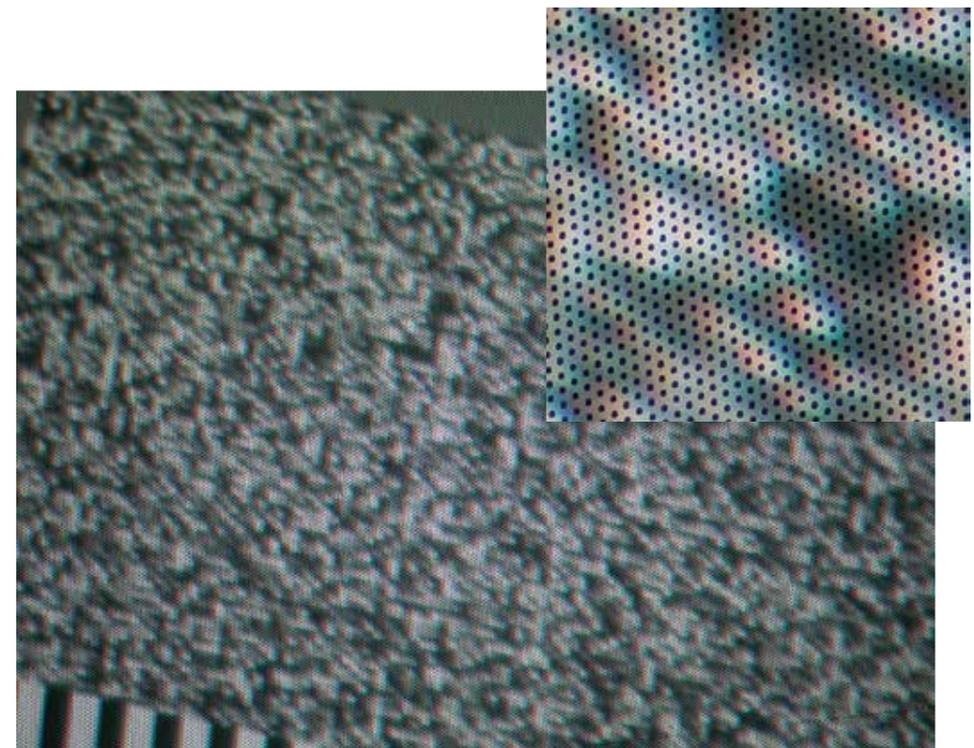
They ensure that every single pixel contributes to the razor-sharp picture on the dome. Neither chromatic aberration nor optical distortions spoil the image quality.

ZEISS VELVET with its DIGIGON lens shows off its strengths in the projected image, as compared to a commercial projector for full-dome projection.

VELVET is a leading-edge ZEISS digital projection system, the very best you can have for simulation applications.



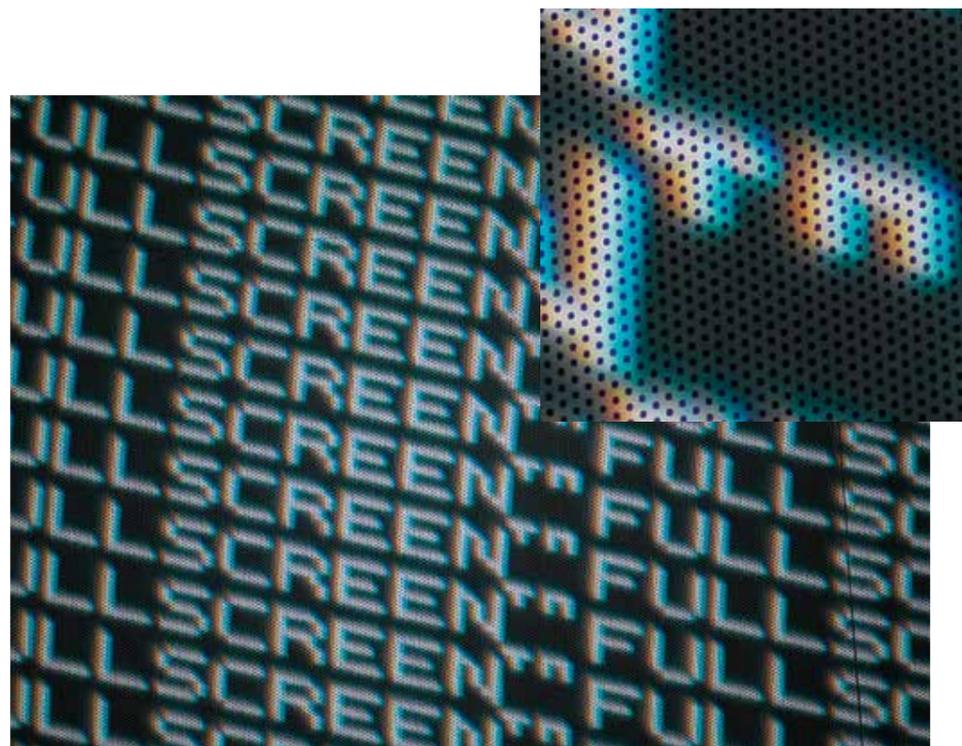
Segment of a projected image, VELVET/DIGIGON (test image)
 Definition: excellent – distinct pixel separation
 Exposure data: Canon EOS 5D Mk II, ZEISS Macro-Planar 2/100



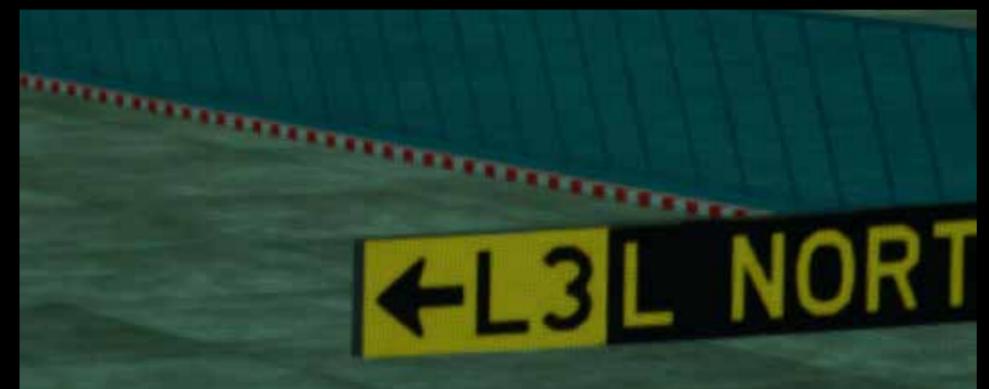
Segment of a projected image, F35/NAVITAR HM117/11.7 – (test image)
 Definition: mediocre – pixels blurred
 Exposure data: Canon EOS 5D Mk II, ZEISS Macro-Planar 2/100



Segment of projected image, VELVET/DIGIGON (test image)
 Lateral color: negligible – less than 1/4 pixel width
 Exposure data: Canon EOS 5D Mk II, ZEISS Macro-Planar



Segment of projected image, F35/NAVITAR HM117/11.7 – (test image)
 Lateral color: clearly visible – 2 to 3 pixel widths
 Exposure data: Canon EOS 5D Mk II, ZEISS Macro-Planar 2/100



Due to the outstanding ZEISS DIGIGON lenses, the pixels displayed are razor-sharp without any chromatic aberration or optical distortion.

Modular structure of the ZEISS VELVET projector



A useful extra for the VELVET system: the 10-bit blending box.

A world first: The 10-bit blending solution - The unique new 10-bit-capable video electronics make it possible to perfectly display grayscale from flawless white to smooth black. Four times as many shades of gray are available compared with standard 8-bit video signal processing.

The blending areas between the projection channels are therefore completely artifact-free, and the channel transitions normally visible with dark images are now a thing of the past, meaning total immersion in the projection.

The ZEISS VELET shows its strengths during operation because of its very low failure rate. The bulbs are the only wear parts and must be replaced approximately every 2,500 hours. To replace the bulbs, simply detach the bulb housing from the side, insert the new bulbs and reattach. The entire process takes less than ten minutes. In the event of a defect, the power supply unit can likewise be detached and reattached. No adjustments are necessary after exchanging the bulbs or the power unit, and the ZEISS VELVET system can be used again

immediately. Although defects are a rarity, exchanging the bulb housing or the power supply unit eliminates 90% of defects which do occur.

If you have purchased ZEISS VELVET projectors but later decide to use a different light source (LED, laser or infrared projection), you do not need to get rid of your ZEISS VELVET projectors! ZEISS VELVET systems can be refitted with a different light source as well as with infrared projectors. More than 75% of ZEISS VELVET systems are retrofitted. The modular design makes this possible.

Technical data

Image format / pixel resolution	WQXGA / 2,560 x 1,600 native
Display technology	LVDS DMDTM with DarkChip3™ ZEISS True Black Projection Technology
Brightness	1,500 lumen
Contrast – ratio, static (on/off)	2,500,000 : 1
Color rendition	30 bit RGB
Aspect ratio	16 : 10
“Smearing Reduction”	Motion-Mode 1 (50%) und 2 (25%)
W x H x D	674 mm x 729 mm x 500 mm
Mount lamps	2x 330 W P-P-VIP, 2,000 h (nominal life time, eco-mode 2,500 h)
Input	Video: DisplayPort v1.1a digital RGB Control: RJ45 TCP/IP network
Power Input	100-127V ~ / 220-240V switchable; 50-60Hz 1000 VA in full operation,
Power consumption	30 VA in stand-by
Weight	62 kg
Noise level	Max. 58 db

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