

# Solutions for Simulation, Training and Entertainment

## Fully automated Calibration System for Edge-blending and Warping

### Our technology

domeprojection.com is a leading expert in integration of display systems for simulation and training. Our products enable the creation of highly immersive experiences of virtual worlds.

We offer full-service and special solutions for arbitrary display system set-ups.



The main focus of our technology is the automated calibration of display systems. Our technology uses a camera based approach. The toolset includes a fully controllable camera head with up to three axis, a digital camera with calibrated optics and a sophisticated calibration software.

We are able to calibrate arbitrary screen set-ups without any additional requirements like calibrated marker points, LED- or other implemented calibrated grids, modified screens or specific grid projections.

The system is easy to use and is addressed to system integrators and manufacturer of display systems as well as a service (calibration) and/or as a customized solution for fixed integration into simulation and training facilities.

Calibration can be done for real-time 3D applications (training simulators) as well as for

static 2D content (cinema, overlay presentations). The different geometric corrections can be handled with the domeprojection.com toolsets.



The toolset also includes hardware accelerated rendering tools for cutting, warping and calculating blending into film sequences as needed for cinema applications without additional warping & blending hardware.

Once the calibration process is completed we enable our customers to apply the calibration data (calibration matrix and view frustums) to their warping and blending systems. These values are highly precise and the calibration quality is measurable.

### Calibration Matrix

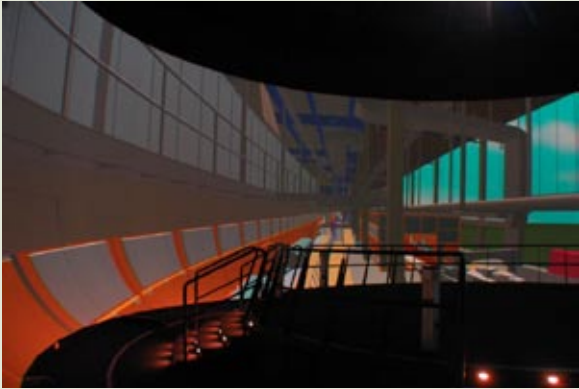
The calibration matrix can be used for:

- application with real-time warping & blending hardware like openWarp™ or silicon Optics™
- application with warping & blending solution integrated into customer's 3D image generator software
- calculating new calibration matrix for additional eye points without repeated calibration process
- render film sequences with applied warping and blending for cinema applications

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domeprojection also offers integration of hardware-accelerated warping and blending solutions into customer's 3D-image generator software.

Integration of automated color calibration is another option of the toolset.

### **Multiple eye point calculation**

Once a system is calibrated we can generate different calibration matrix for other eye-points. This way it is no longer necessary to do multiple calibrations for the same system if different eye points are necessary.

In combination with a tracking system and openWarp™ - which is able to apply different warping data for each frame - our solution offers eye point adoption in real-time. This feature will enable further development of highly immersive display systems.

### **Auto Alignment**

The toolset can be implemented into any display system as a true auto alignment system. Using the data from the initial calibration or known system descriptions, the display system can be automatically aligned within a very short time.

For this purpose some marker points are necessary to recognize the position of the



measurement camera. These marker points do not need to have any specific regularity or measured positions. All this will be done during the initial camera based calibration set-up.

### **Benefits**

- precise automated calibration
- resolution and projector independent
- feasible for any arbitrary projection shape
- no additional requirements, no special prepared screens
- generating multiple eye points from a single calibration
- time saving and measurable quality
- fixed installation as well as on-demand calibration service
- can be adopted to customer's real-time warping & blending solution

### **Demonstration Lab**

Visit us in Magdeburg and get a demonstration of our system consisting of:

- a seamless 4-channel projection of
- a real-time 3D environment on a curved screen
- a fully automated camera-based calibration system for edge-blending and warping of nonproprietary projection systems without further calibration aids. The system allows for variable design eyepoints for multiple users.

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