

# Multi-projector calibration application

## – manual

---

Author: Jiri Zahradka

An application for geometric and intensity calibration of a projector array. The projectors utilize an attached camera to automatically compute the relative pose among them. The application includes intensity blending for seamless overlapping of projector images.

### Requirements

- 4 or 2 projectors
- Camera canon 50D
- Planar projection surface

### Default display layout

LCD display 1280x720	Projector 1 800x600	Projector 2 800x600
	Projector 3 800x600	Projector 4 800x600

### Calibration process

1. Connect camera and projectors
2. Setup default projector layout.
3. Run calibration application.
4. For each projector
  - 4.1. Render checkerboard and take a picture (press key “n” and “t”)
5. Show calibration result = render seamless rectangular image. (press key “a”)

The application creates projective transformation matrix and intensity attenuation map for each projector. The matrix represents transformation between a projector image coordinate system and result seamless image. The matrix is stored as OpenCV matrix in file "var/Projector\_hom\_X\_1.txt", where X is projector index. The attenuation map is stored in "var/lightMap\_X.jpg", where X is projector index.

### Application control keys

- n – Switch between projectors while rendering checkerboard.
- t – Take a picture while rendering checkerboard.
- +/- - Increase/decrease number of columns and rows in checkerboard.

- Esc – Quit application.
- a – Test result, render seamless rectangular image.
- q – Switch between test images while testing result.
- w – Show grid while testing result.
- p – Show intensity attenuation maps, after calibration.