

Projection Mapping

Projection mapping, also known as video mapping or spatial augmented reality, is a projection technique used to turn objects, often irregularly shaped, into display surfaces for video projection. The objective of mapping is to create optical illusions by putting visual content on static volumes.

If you are looking for general video projection information look here: [Video Projection](#)

- [What is Projection Mapping?](#)
- [Software for Projection Mapping](#)
- [Choosing Video Projection Hardware & Space](#)
- [Creating content for Projection Mapping](#)
- [Inspiration](#)
- [related HKU Bookstack pages](#)

What is Projection Mapping?

Projection Mapping uses everyday video projectors, but instead of projecting on a flat screen, light is mapped onto any surface, turning common objects of any 3D shape into interactive displays. More formally, projection mapping is "the display of an image on a non-flat or non-white surface".

[Frequently asked Questions](#) about Projection Mapping (by NoktaVisual)

<https://www.youtube.com/embed/skU3T8bgEIM>

<https://www.youtube.com/embed/FEZuE9Til78>

Projection mapping: a historical view

These three examples give a very rough and non objective timeline/history of the development of projection mapping

1. Michael Naimark's *Displacements* (1980)

<https://www.youtube.com/embed/bFIP9jcUF-4>

Michael Naimark's *Displacements* (1980) is a foundational work in the history of projection mapping because it used filmed imagery projected back onto the exact physical environment it was recorded in, creating a striking illusion where reality and projection seamlessly merge.

By aligning moving images with real-world objects, *Displacements* anticipated the core technique of projection mapping—precise spatial registration—making it one of the earliest examples of transforming physical space through projected media.

2. Pablo Valbuena's *Augmented Sculpture* (2006–2007)

Pablo Valbuena's *Augmented Sculpture* (2006–2007) is often seen as an early milestone of projection mapping, as it precisely layers projected light onto physical structures to create the illusion of transforming three-dimensional space.

3. Pharrell Mashup (Happy Get Lucky) - Pomplamoose (2014)

<https://www.youtube.com/embed/i7X8ZnmLfM0>

The Pharrell Mashup (Happy Get Lucky) - Pomplamoose by Pomplamoose is important for projection mapping because it shows how visuals can be precisely synchronized with music.

Using only one projector, cardboard, and Adobe Premiere Pro, it reflects how projection mapping can be simple yet effective in aligning image, sound, and physical space.

Software for Projection Mapping

Projection Mapping can be done with various kinds of software.

Here's an overview of a couple (let us know if we're missing any)

Software	Short description	Video mapping tutorial	Licensing
After Effects	Old school Mapping!!	https://www.youtube.com/embed/X6CYgIHuof8	part of the creative cloud
Resolume	Resolume Arena is a VJ tool with built in excellent Projection Mapping software.	https://www.youtube.com/embed/G2RigLjhEjM	Free (with watermark)/ Dongle
Isadora: Izzy Map	IzzyMap offers interactive control of mapping attributes, allowing real-time motion graphics to become part of your design. By taking control of these parameters during your show, slices and masking can be layered and composited within each instance of IzzyMap, and multiple instances of IzzyMap allow your mappings to be layered and combined in endless ways.	https://www.youtube.com/embed/KOpIpApXx14	Free (no saving)/ Dongle
Touchdesigner	Various projection mapping tools, 2D & 3D.	https://www.youtube.com/embed/mTH7ZB4x47Q	Free (limited resolution)
Madmapper		https://www.youtube.com/embed/1Typv7KxBRM	
Blender		https://www.youtube.com/embed/l4vhXj-tPrs	Free
VPT	Video Projection Tool (VPT) is a free multipurpose realtime projection software tool.	https://www.youtube.com/embed/it2Haaam6U0	Free

Other software for mapping for specific video mapping purposes

[Arkaos](#)

[Heavy M](#)

[WatchOut](#)

[Disguise](#)

[MappingMatter](#)

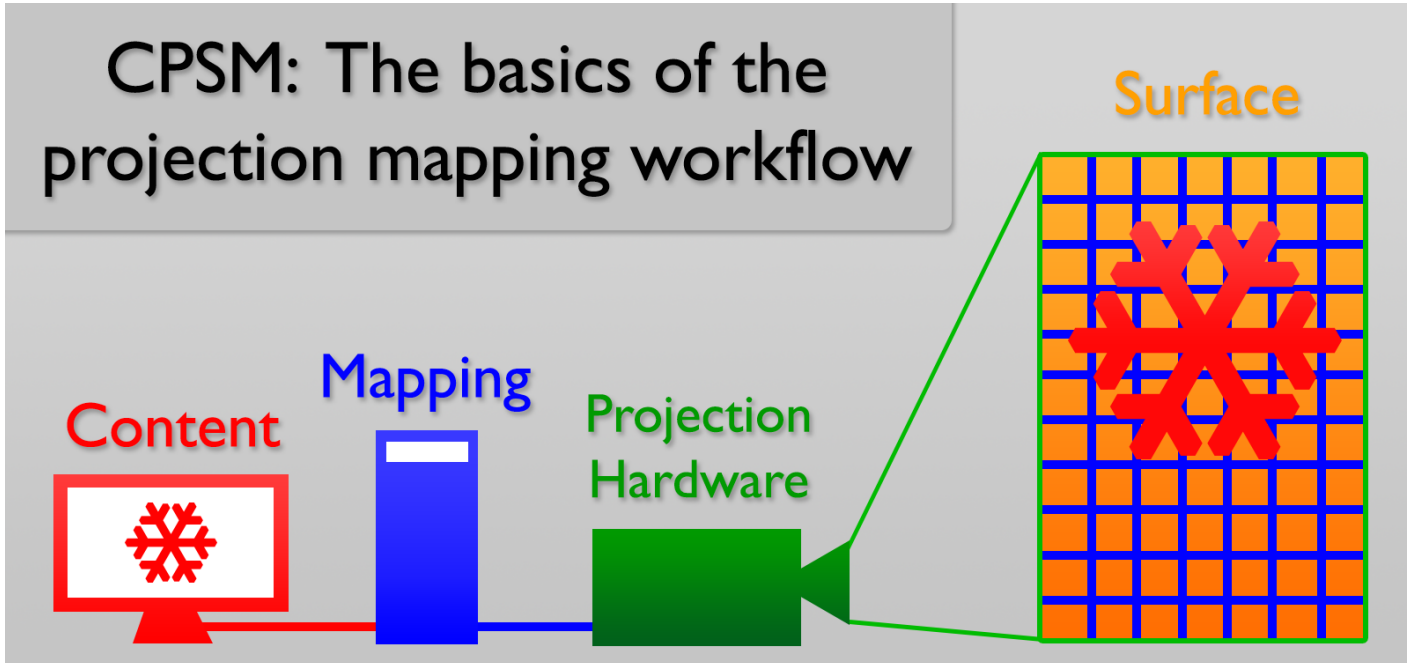
[ScalableDisplay](#)

[Mapio2](#)

[Millumin](#)

[the-mega-list-of-vj-software-and-tools](#)

Choosing Video Projection Hardware & Space



When projection Mapping you obviously need a video projector. But matters which one you choose as they all have different specifications that influence the outcome.

Check out this awesome website to help you calculate these things & find the perfect video projector : <https://www.projectorcentral.com/projection-calculator-pro.cfm>

Features of a projection mapping projector

Luminosity

Luminosity describes the amount of light a video projector puts out. It is measured in lumens. A high number of lumens means a projector is more powerful. As mentioned previously, powerfulness itself isn't enough. You also need to take all the constraints of a specific project into account, as these might reduce a projector's objective powerfulness, such as the light levels of a location, the expected image size and the material of the projection surface.

Contrast ratio

Contrast levels are linked to the luminosity difference between white and black (absence of color). No video projector is able to project perfect black—this color is usually replaced with a very dark grey.

Contrast is described by a ratio, such as 500:1. The bigger the difference between both numbers, the better the contrast. Therefore, 1,000:1 provides better contrast levels than 500:1.

Resolution

A projector's resolution is the number of pixels, from side to side and top to bottom, which makes up your projected image. A high number of pixels means the image will be more precise. A low number of pixels means it will be harder for the naked eye to distinguish them.

A projector's resolution should be as close to possible as the image's. If you wish to project full HD content (1,080p), this means your projector also needs full HD resolution. If you use a projector that is more powerful (4k, for example), this will lead to a disappointing result.

When choosing a projector, it also depends on where you plan to do this mapping. Other key factors to consider :

Light conditions

The light level of the area where your mapping is supposed to take place is a fundamental factor, as light conditions play a significant role regarding the quality of the projected image.

Direct light on the projection surface needs to be avoided at all costs, whether it is natural or artificial, as it would fade the image, even with strong contrast levels.

Therefore, you should pick a fairly dark environment without direct light coming to your projection area. It is impossible to do Projection

Image size and throw ratio

Image size and projection distance are linked by a very simple mathematical formula:

ratio-formula-en

This throw ratio is linked to each type of video projector. It is a number that falls between 0,3 and 12. The bigger this number, the longer the throw distance. Thanks to this formula and by knowing two parameters, you can easily find out what the third parameter is.

Here is the calculator again: <https://www.projectorcentral.com/projection-calculator-pro.cfm>

Material of your projection surface

The material of your projection surface is also a crucial factor to consider. You should pick a light-colored surface and pick matt materials to reduce light reflection. If you end up using a shinier surface, the image quality will decrease, and you might see your projector's light's reflection. This should be avoided to ensure better results.

Tip: If using a video projector with a short focal distance (with a throw ratio below 0.5), we recommend avoiding flexible projection surfaces, such as fabric. This is because even a slight movement of the projection surface might distort your image.

Creating content for Projection Mapping

As projection mapping is mostly not done on regular rectangular surfaces, content is also specially made.

Of course there are numerous ways to do this using masks or generative abstract content. here's some ideas to get you started:

<https://www.youtube.com/embed/AUbPWesO3KU>

<https://www.youtube.com/embed/vGLVUpeJD6k>

Inspiration

Here's a nice collection on [Projection-mapping.org](https://projection-mapping.org)

be sure to also check [these](#)

<https://noktavisual.com/faq/> nice FAQ on what projection mapping is. Check out his work while you're there!

Projectionmapping in theatre examples:

[La Mélodie d'ici et là - Cie Sens Dessus Dessous - Teaser 2020](#)

<https://www.youtube.com/embed/zqYzBFD2G00>

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<https://www.youtube.com/embed/5UY5cpE6uN4>

<https://www.youtube.com/embed/dk8lJjp1ZdE>

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