WHAT IS PROJECTION MAPPING?

Projection mapping is the process of projecting onto an irregular, 3D surface and distorting images or video so that they appear to fit onto the 3D surface.

BEFORE YOU START

- Think about how the audience will view the work. Mapping often takes the form of a simple front projection – the audience will usually view the work from the front and at a particular angle.
- Ensure the projector throw covers the entire surface you want to map on to.
- Ensure the projector is in the same position throughout the mapping process.
- Simple cubes or straight angled objects are far easier to map to than globes/curved objects.
- Light colour objects are more effective to map to than dark ones.

WHAT YOU WILL NEED

A laptop/computer with HDMI or VGA output
A surface to map on to
A projector (one with a good lens shift function is ideal)
Mapping software (see below)
Resolume Arena is software designed to project live visuals on the fly. It also includes a relatively straightforward mapping function. Arena may be a good choice if you are intending to create a ‘live’ mapping performance piece.

**ARENA - PROS**

Can manipulate clips, add effects and change running order live in real time
Mapping feature relatively simple + ‘snapping’ grid aids mapping
Can use 2 or more projectors (if your computer can handle it) for more complex setups
Also accepts MIDI devices / live camera inputs for live mapping / performance

**ARENA - CONS**

Steep learning curve - you’ll need a basic working knowledge of Arena before you get the most out of its mapping features.
Can be tricky to map complicated / curved objects - works best with straight lines/cubes/squares.
Not well suited to ‘narrative’ type mapping.
Long clips don’t work well – suited to short loops.
ARENA WORKFLOW

1/ Make sure your projector is set up as a ‘separate display’ in display preferences
2/ Assign clips to layers
3/ In Output > Advanced make sure ‘Screen 1’ is set to your projector output
4/ Add ‘slices’ and mask out separate areas (‘transform’ scales the whole slice
   ‘Edit Points’ allows you to warp each point of the slice) - add more points to the
   slice by using the add vertex option in the bottom right of the screen.
5/ Assign a layer to each slice
6/ Save and close

TIP - if working with your own/found clips ensure you convert the files to .movs
with Arena’s DXV codec (in MPEG Streamclip or Arena Alley) - large (or long)
files will be laggy/hard to work with in Arena.

Example of Advanced output in Arena. Each mask (or ‘slice’) is assigned to a
layer resulting in different clips playing within each slice.
ADOBE PREMIERE
(https://www.adobe.com/uk/products/premiere.html)

Primarily used as editing software but can be used to create simple maps. Useful if you already own/are used to Premiere. Be aware that as Premiere is not designed for creating shapes/masks etc. so it can be tricky to warp/mask shapes and clips.

PREMIERE PROS

If you’ve used Premiere before it’s relatively easy to ‘map’ simple shapes within the software
Easy to create a linear timeline/narrative (especially if in time to audio)

PREMIERE CONS

Can be difficult to warp and distort masks in Premiere
No grid guides etc to help snap objects in place + curves/freehand difficult
Often needs rendering to play back smoothly
Limited to 1 projector output

PREMIERE WORKFLOW

1/ In display preferences ensure display output is set to ‘separate space’
2/ In Premiere Premiere Pro CC > Preferences > Playback - click the second output for display
You should now see the timeline output on the projection screen. (you may have to do this a few times for it to work)
3/ Add shapes/clips to your sequence
Use the Motion preferences in Effect Controls to change size, rotation etc. (it helps to uncheck ‘Uniform Scale’ at this point)
4/ To distort or warp the image ‘corner pin’ in effects allows you to distort the corners to a small degree
5/ Build up each shape on a separate video layer
Premiere preferences – full screen output set to Monitor 2 for full screen playback.

Example of a simple mask in Premiere using Motion and Corner Pin setting.
AE is primarily used for motion graphics and digital animations. However, it can be used as mapping software and functions fairly well in relation to creating masks, shapes, manipulating clips etc.

**AE PROS**

Creating shapes, masks, freehand drawing is extremely flexible
Grids and guides to help snap elements into place
Relatively easy to create a linear timeline

**AE CONS**

Always needs rendering before realtime playback
Can be RAM intensive - slow on older laptops
Fairly steep learning curve if you haven’t used AE before
Limited to 1 projector output

**AFTER EFFECTS WORKFLOW**

1/ In display preferences ensure display output is set to ‘separate space’
2/ In AE: AFTER EFFECTS CC>PREFERENCES>PREVIEW and make sure output is set to the connected projector
3/ To create shapes either use the create shape tool or create a new solid (Layer>New>Solid) – then create a new mask (masks are much easier to manipulate than shapes)
4/ For clips - mask clips and use distort effects to warp the image/s

Each shape/clip will be on its own separate layer. It’s good practise to give each layer an appropriate name and lock them when not in use.
Above: Creating a simple map in AE. Each shape is created on it’s own layer.
Madmapper is a dedicated mapping program. It’s interface and terminology is quite different other video editing programs (it’s quite similar to Arena in some respects).

**MADMAPPER PROS**

Specifically designed for projection mapping – easy to warp and distort clips  
Guides & grids make snapping to surfaces simple

**MADMAPPER CONS**

Steep learning curve – takes a while to get used to terminology and layout  
Not particularly well suited to complex, narrative mapping

**A BASIC MADMPerrer WORKFLOW**

1/ In display preferences ensure display output is set to ‘separate space’  
2/ In MM click the projector icon and ensure ‘Output Destination’ is set to connected projector  
3/ Import movie clips (click + next to ‘Movies’ and import)  
4/ Create a ‘quad’ or shape (a quad is a sort of mask which you can add clips to)  
(Each quad or shape inhabit their own layers – turn them on or off in the layer window)  
5/ Select a layer and click on the clip you want to add into it  
6/ In the left window (Input View) crop the image to the quad  
7/ In the right window (Preview View) change the size/warp the map shape
SCENES

A scene is MM taking a ‘snapshot’ of the current preview window. Scenes live in the top row of the scenes/cues window (see above).

To add a scene, click + in an empty scene slot. Change the layout in the preview window, right click on the scene and select ‘update scene’ – MM now ‘remembers’ this layout in the preview window.

Continue to add scenes, adding/hiding layers as you go to build up a sequence. Add fades and change scene duration in the cog icon (just above the scene window).

Play the sequence by clicking the PLAY icon just above the scene window. Each scene will now play left to right.

TIP: Hold ALT and drag a scene to a new lot to duplicate it.

SOME MAPPING RESOURCES

Mapping History
https://en.wikipedia.org/wiki/Projection_mapping

PMC (Projection Mapping Central)
http://projection-mapping.org/

Scenes & Cues in Madmapper
https://www.youtube.com/watch?v=rXennwOHXXQ

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