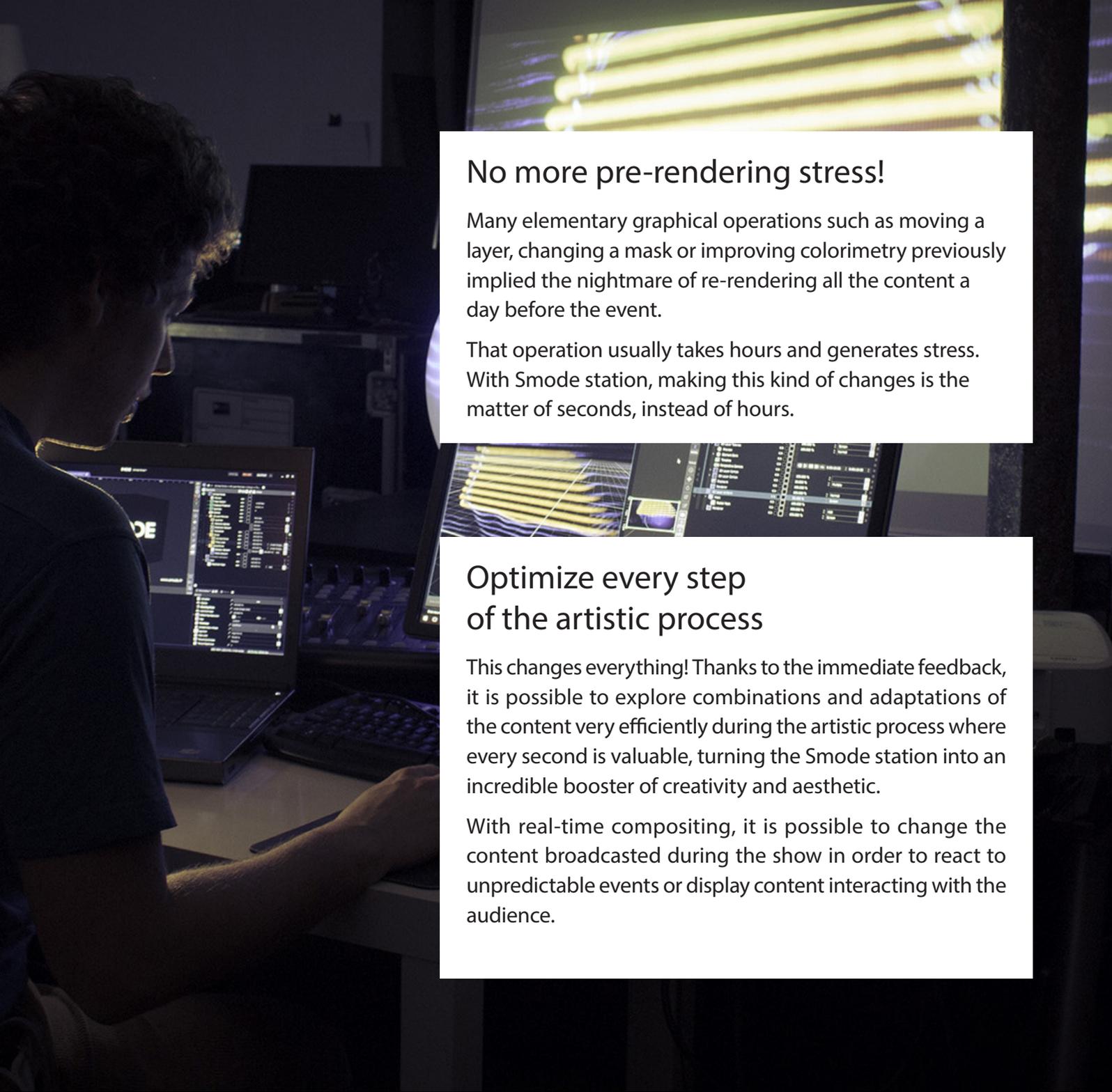




SMODE Real-time compositing station

Smode station: the unique combination of a media server and a real-time compositing engine. Having these two components integrated together deeply changes the approach to video content encoding and manipulation in events. Thanks to real-time compositing, many things can be changed at the crucial — and most costly — time: when the stage, director, actors, lighting, sound, and cameras are available.



No more pre-rendering stress!

Many elementary graphical operations such as moving a layer, changing a mask or improving colorimetry previously implied the nightmare of re-rendering all the content a day before the event.

That operation usually takes hours and generates stress. With Smode station, making this kind of changes is the matter of seconds, instead of hours.

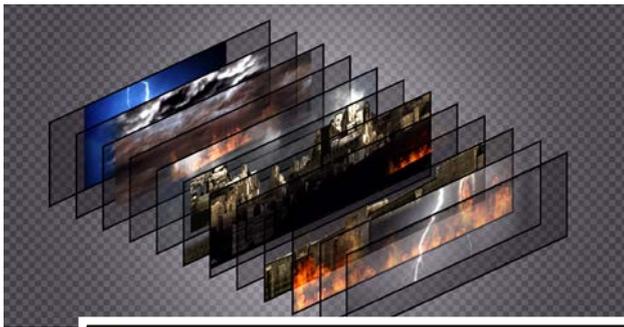
Optimize every step of the artistic process

This changes everything! Thanks to the immediate feedback, it is possible to explore combinations and adaptations of the content very efficiently during the artistic process where every second is valuable, turning the Smode station into an incredible booster of creativity and aesthetic.

With real-time compositing, it is possible to change the content broadcasted during the show in order to react to unpredictable events or display content interacting with the audience.

– FEATURES –

MULTI LAYER 2D/3D COMPOSITING



Smode is a multi-layer compositing engine working with 2D and 3D layers. The different layers are blended together in real-time with full support of the alpha channel and blending modes. Each layer can be placed, masked and modified with the result of the composition available in real-time at interactive frame rates (30 – 60 fps).

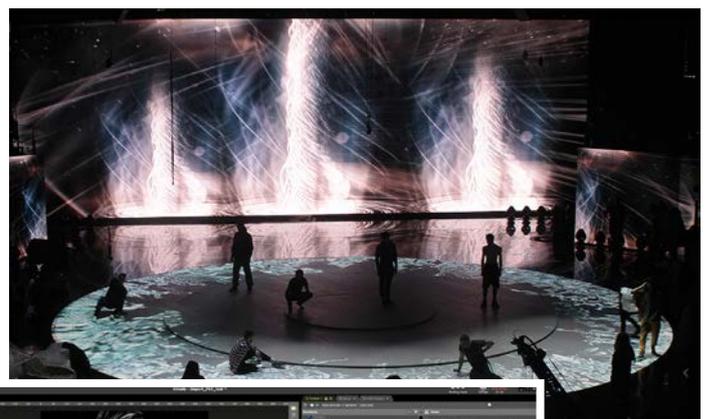
Layers can either be based on image or video files or they can be generated. For large compositions, you can easily group layers in a pre-composition. Compositions can also be referenced to be rendered inside other compositions, all of that in real-time.

In order to render 3D layers, Smode's 3D engine implements numerous real-time rendering techniques including support for advanced materials, shadow mapping, volumetric lighting and 3D deformers. The 3D Engine of Smode enables the creation of primitive geometries from scratch or the import of models from FBX files.

PARTICLES SIMULATOR AND GENERATIVE CONTENT

Smode provides an efficient fully GPU-based particle simulation engine able to deal with up to millions of particles in real-time. Particles can be used to create very quickly all kind of content from fire to water and from stars to snow. Smode supports both particles without physics (aka "points") and particles with physics, on which fields operate. 3D modifiers can be combined freely to modify all attributes of the particles. The particles can be rendered with sprites, spheres, boxes or custom geometries. Its also possible to produce trails in the form of motion lines or of secondary particles.

Beyond particles, Smode provides a number of techniques that enable creating content very quickly using few or even no data at all, i.e. in a fully generative fashion.



3D STAGE SIMULATION



Smode provides a 3D stage environment for video projection and led screens real-time simulation and previewing.

The stage let you define your video-projectors, projection surfaces and led screens in a 3D environment and provides a real-time simulation of the expected result. Once the stage is defined, you can push any video content through it – be it a still image, a video or generative content – and obtain a preview of the result in real-time.

Video projector simulation

Smode has an advanced video projectors simulation mode that takes luminosity, occlusions and resolutions into account. Thanks to this simulation, it is possible to make informed decisions in the early steps of a project, notably by identifying potential problems and comparing alternatives on how many projectors to use, which lens to use, how to position them, etc.

LED Screen simulation

Smode enables to model LED screens and LED strips directly in the 3D Stage space. Content can then be sent either directly onto the screens or into virtual projectors that affect individual led pixels.

Stage based previsualization

At any step of a project from the call for tender till the last day, the stage simulator enables to produce a fast real-time previsualization of video content. Thanks to this previsualization, artistic directors can take better decisions and graphic designers can have an immediate feedback on how their content will look like once on stage. Stage-based previsualizations can also be exported as videos to make client demonstrations.

VIDEO MAPPING

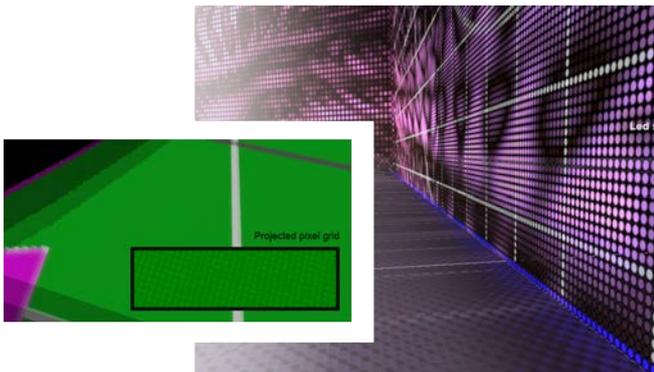


Image warping and Soft-edges

Smode provides a wide toolbox for multi-projector video mapping: warp grids and bezier grids with any number of points, soft edge edition, polygonal masks, etc. In addition to this, all the colorimetry and distortion modifiers applicable to content are also applicable to the video-projector images. There is thus a huge palette of effects that can be applied as per-display post-effects.

UV-based 3D Video Mapping

If a 3D model of the projection surfaces is available, it can be imported inside Smode through the FBX format. Content can then be defined in the UV-map of the model and Smode takes care of computing each video-projector view in real-time.

Programmable Pipeline

Instead of forcing one particular video processing pipeline, Smode provides a programmable pipeline that can cover the whole range of scenarios from the simplest 2D transformation to the most advanced video mapping setups with moving objects. Nodes in the pipeline correspond to content maps, video projectors, led screens, intermediate mappers and the final mapper. These nodes can be connected in all possible ways and 2D modifiers can be plugged anywhere in the processing chain.

Multi-channel content

On complex setups mixing different projection surfaces and led surfaces, it is often very constrained full to force all the content being defined inside a single rectangle of pixels. Similarly to, e.g. Dolby 5.1 for audio, Smode relies on the concept of multi-channel content. On the side of the pipeline, you define channels corresponding for example to a background LED screen, a video mapped surface and auxiliary LED screens. Once these channels are defined, content unit called scenes define the video content for every possible channel. This multi-channel concept enables a clean interface between content designers and setup designers making the boundaries of the responsibilities clear.

CUEING AND ANIMATION

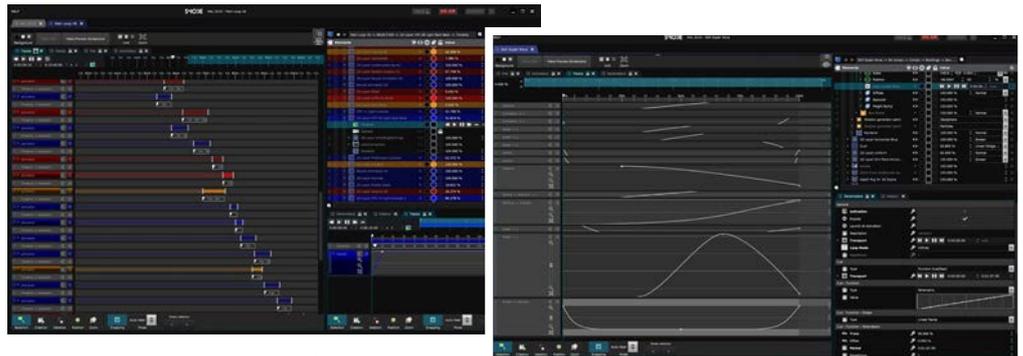
Thanks to advanced cueing and timeline concepts, it's easy to animate any of the parameters of your compositions.

Animate anything!

Since compositing occurs in real-time, nearly every parameter of your compositions can be animated: from simple opacity parameters to advanced placement and deformation parameters in 2D and 3D layers. It is even possible to make one animation act on another one. This makes it possible to implement non-trivial logics such as making a loop animation, and then making other animations that can start or stop that loop.

Linear and non-linear animation

Smode supports both linear and non-linear animation. Linear animation is defined through timelines and corresponds to entirely pre-programmed blocks of animation. Non-linear animation is defined through cues, similarly to what is done in lighting encoding. Cues correspond to pieces of animation and they can be triggered either manually by the operator, or through a mapping with some external device, such as a DMX console or an incoming time code.



From full live to fully pre-programmed

Each piece of content can provide its own timelines and cues. Smode then supports different show scenarios:

- *Time-coded scenario*: if both content order and timing are fully pre-defined, it is possible to create a huge timeline taking content-specific animations back into a single time referential, which can be mapped to an input time code.
- *Performing arts scenario*: if the order of the actions is predefined but the precise timings is not, it is possible to create a sequence of cues that define an order among content loading/unloading and content-specific animations. During the show, the operator launches the GO on the cues in function of its landmarks.
- *Live scenario*: if neither content order, nor timings are predefined, it is possible to directly trig content-specific animations in any order.

SHOW INTEGRATION

Smode station supports various inputs and outputs in order to integrate itself smoothly in complex show setups.

Control Input

Smode Station can be controlled via MIDI control surfaces, DMX lighting consoles, or via the ArtNet and OSC protocols. Smode Station relies on a system of rules for linking input devices to specific actions in the composition. Such actions can for example be to make a layer visible, to change an opacity parameter or to launch an animation. To create a new rule, the learn feature enables to quickly associate a specific controller to the parameter being automated. It is even possible to make a rule that activate/deactivate other rules. The assignation of external controllers is thus totally programmable, which enables advanced customization depending on the specific needs of the show.

Clock input

Smode supports three kind of clocks: LTC audio time code (LTC), midi time code (MTC) and the current time clock. These clocks can be used to synchronize animations or to trig rules at specific times. It is also possible to use the current time clock to make generatif content depending on the current hour and date.

Video Input

Optionally, we can provide Smode Station with two 3G SDI inputs using DeltaCast capture cards or two DVI HD1080p inputs using Datapath VisionRGB capture cards. For both, we have dedicated implementations that enable Smode to have a very low latency: less than two frames. For DeltaCast cards, we support DirectGMA,



a technology enabling to transfer video data directly from the capture card to the graphics card. This enables Smode to capture up to 2 HD signals at 50 frames per second. Input video streams are treated like any other layer in Smode: it is possible to apply any 2D modifiers on them, to mask them, or even to generate 3D content depending on them.

DMX Screen and Control outputs

It is possible to output Smode's content onto DMX screens through the ArtNet protocol. Such screens are treated like LED screens and are created and previsualized in the stage simulator.

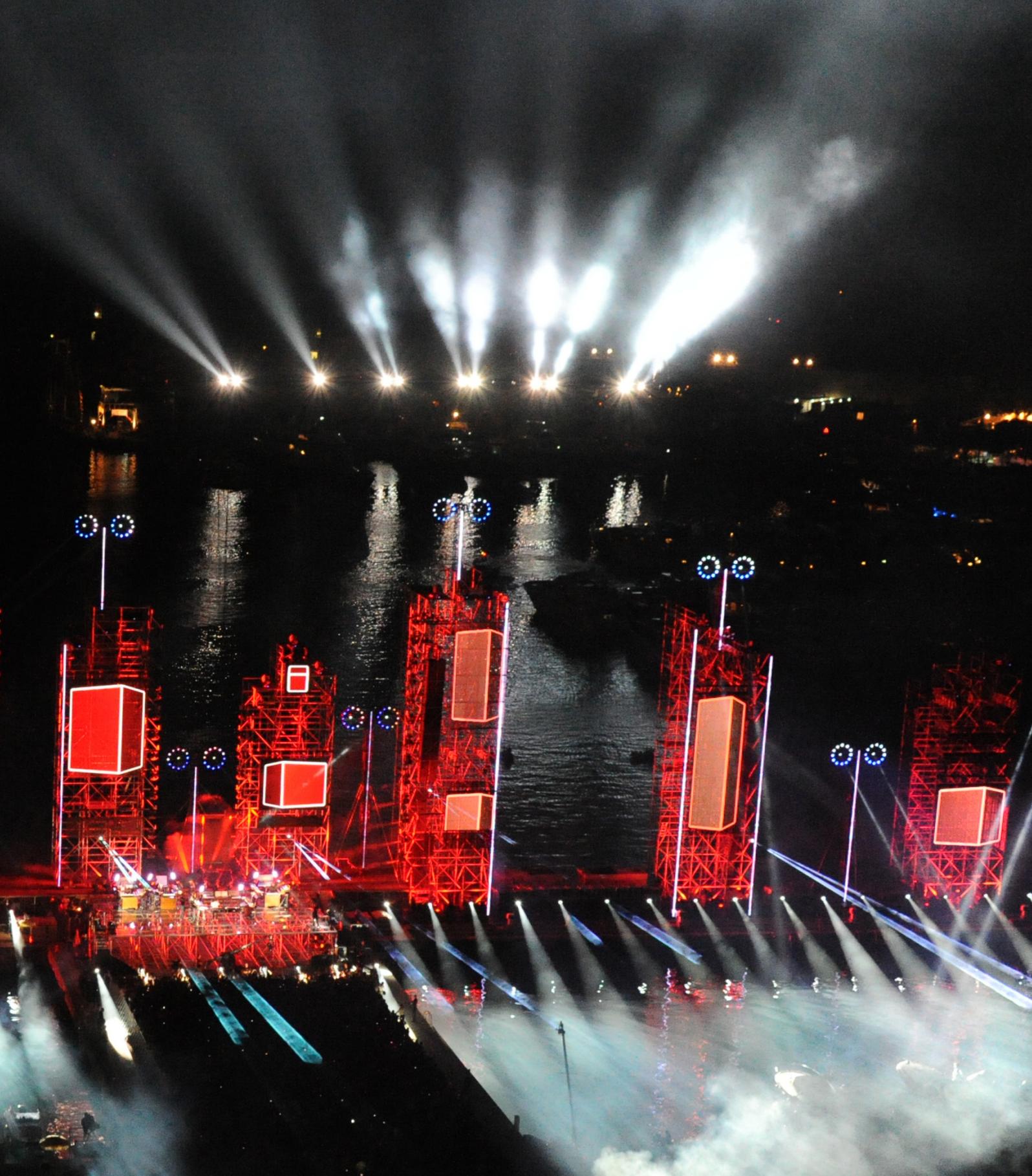
It is also possible to control some specific devices via Smode Station such as Panasonic Video Projector shutter and settings control (PLink) and electromechanically motorized Video Projector (Robe Minime or Beam 1800).

– TECHNICAL SPECIFICATIONS –

Physical Specifications	
Form Factor	4U
M/B Form Factor	Extended ATX (12"x13")
Dimensions (DxWxH)	546 x 430 x 176 (mm), 21.5" x 16.9" x 6.9"
Cubic Feet	4
Shipping weight	20,5 Kg
System Security	Intrusion Switch, Key lock on front door
Hardware Specifications	
Voltage	100-240V
Power Consumption	800W (max)
Operating System	WINDOWS 7 PRO 64BITS OEM
Memory	32Gb DDR4
CPU	XEON 6 CORE 3.5Ghz
Graphics Card	AMD FIREPRO W9100
Storage	480GB SSD
Input/Output Specifications	
Video Output	6 Display Port 2.0 Outputs
Video Input	Optional 2 x 3G SDI or 2 x DVI HD1080p
Audio Output	Balanced XLR Output
MIDI	1 x In 1 x Out
Data Network	10 Gb LAN
Artnet	Dedicated Gb LAN
Data/Peripherals	2 x USB 2.0 4 x USB 3.0
Media File Specifications	
Video Playback	HAP, Apple Pro Res, QuickTime Animation, QuickTime MJPEG
Video Export	HAP, Apple Pro Res, QuickTime MJPEG, Jpeg/Png/Target image sequence
Still image formats	.jpg, .png (with alpha layer), .tga, .tif
Multi-layer image file formats	.psd
3d mesh format	.3ds, .fbx, .svg (splines)
Audio file formats	.wav, .aiff
Special support extended format	Stereo 3D and 10bits color depth
Performance Data	
(with 6 x 1920x1200x50p outputs)	
Video Streaming (.hap)	4K: 6 x 4096x2160p50 HD: 22 x 1920x1080p50 HD: 40 x 1920x1080p25
Layers Compositing	4K: 20 x 4096x2160 HD: 80 x 1920x1080
Support, Updates and Warranties	
License subscription package includes	3yrs hardware warranty (Return To Base) Free software upgrades until major version change 24/7 support (via phone or email) Unlimited knowledge base access

– FEATURES –

Multi-layer compositing engine	
Support of alpha-channel	Input, Output, Pre-compositions
Blending Modes	29 different blending modes
2D Layer Types	Still images, Videos, Uniform, Linear/Radial Gradient, Text, Noise, White Noise, Pre-compositions
2D Mask Types	Polygonal, Spherical, Linear, Bezier, Color-key, Depth
2D Modifiers	11 Color Modifiers, 9 Distort Modifiers, 8 Stylize Modifiers, 3 Blur Modifiers and 9 Utility Modifiers
2D Placements	Parametric, Perspective, Bilinear, Bezier, Perspective Interpolation
Many starter resources	Lots of example compos, Standard pack for modules (library of complex generative effects and objects), presets for every generators & modifiers
Support for extended formats	Stereo 3D and 10bits color depth
Compo operations	Pre-composition, Consolidation, Screenshot, Video Export
3D Engine & Generative content	
Geometry types	Particles, Point Clouds, Splines and Triangular Objects
Point Renderers	Simple Points, Ball Points, Box Points, Sprite Points
Line Renderers	Simple Lines, Thick Lines, Tube Lines
Surface Renderers	Diffuse, Specular, Height Bump, Normal Bump, Environment, Alpha
Built-in geometries	Grid Points, Particles, Random Points, Helix, Know, Star, Rectangle, Text, Box, Cylinder, Sphere, Geosphere, Plane, Torus
3D Mask Types	Random, Linear, Sphere, Depth, Normal, Fresnel, Noise, Color, Texture Coordinate, Age, Velocity
3D Modifiers	11 Attribute Modifiers, 7 Distort Modifiers, 6 Operator Modifiers and 2 Utility Modifiers
Light	Ambient, Directional, Omni, Projector, Rectangular, Spot, Volumetric – Support for casted shadows
Complete 3D environment	Ability to create complex 3D scenes that integrate 2D layers and modifiers at any point in the pipeline
Stage Simulation	
Stage Elements	Surface, Video Projector, Led Screen, Mapping, Group
Video Projector Simulation	Shadow simulation, Luminosity Simulation, Simulation of Projected Pixel Grid
Led Screen Simulation	Led screen preview in 3D Space, Simulation of Led diffuse and volumetric light
Stage based previsualization	Possibility to make previsualization for both artistic and technical purposes
Video Mapping	
Image Warping	Perspective, Bezier and Warp grids
Soft-edges	Support soft-edges defined in both 2D and 3D space
Video Mapping Techniques	2D / 3D with uv-mapping or camera-mapping, support for motorized panels
Programmable Pipeline Elements	Content Map, Content Area, Virtual Screen, Video Projector, Led Screen, Intermediary and Final Mapper
Animation	
Animable objects	Any parameter of any element (2D or 3D layer, tool, ect)
Linear animation - Timeline	Support of timelines to animate content, other timelines or linearize non-linear animation (cues)
Non-linear animation - Cues	Support of non-linear animatons for performing arts and operator based live animation
Functions	Functions to implement automatic animation in cues and timeline (standard easing functions like in css, and more advanced dedicated functions)
Show Integration	
Control inputs	MIDI, DMX, ArtNet or OSC
Rules	Link input device to parameter, parameter to parameter, parameter to output device
Lua Scripting	Scripting engine with Lua langage
Learn	Quickly map a control input (fader, button, ect) to a parameter in smode in a few clicks
Clock Input	LTC audio time code (LTC), midi time code (MTC) and the current time clock (current time and date of the RTC station)
DMX Screen	DMX video ouput, treated like a LED screen in smode
Control output	Control Video Projector Shutter with PJLink



Address:
Neuville Industrie Bat K2
53 Av. Carnot
69250 Neuville sur Saone

Phone: +33 6 33 28 41 91

Email: info@harkan.fr

Web: www.harkan.fr