Interactive experiences
made more accessible than ever

From the start, Modulo Kinetic was designed aiming at interactive experiences. After years of on-going developments and as technology evolves, Modulo Kinetic now offers a full array of features instrumental in building engaging interactive experiences with no coding needed.

Benefits of the fully-integrated approach

Modulo Kinetic stands out as the only media server that directly incorporates advanced interactivity features, reflecting Modulo Pi's commitment to a fully-integrated solution. This approach offers several key advantages:

- **Complexity reduced:** Enjoy a much simplified control room with no need for gateways to a suite of third-party tools. Setup and operation are made easy through one user-friendly interface
- **Performance & reliability improved:** Latency is limited, as room for bugs and interoperability issues
- **Budget under control:** It saves from having to invest into a complex suite of solutions. Also, no need for expensive custom developments

Endless possibilities to fit your project's needs and budget

Access several types of interactions using Modulo Kinetic, from basic to the most creative and elaborate experiences:

- **Web applications:** Interact with an AV setup using a web app on a smartphone, tablet, or touch screen
- **Control systems:** Interact by manipulating cost-effective sensors such as RFID tags or a great variety of USB sensors
- **Encoders:** Create an interaction based on motion control devices
- **Cameras & scanners:** Capture and dynamically update a photo or image scanned in a show real time
- **2D & 3D LiDARs:** Rely on this touchless technology for create gesture-based interactions
- **KineMotion:** Optical tracking module fully developped by Modulo Pi

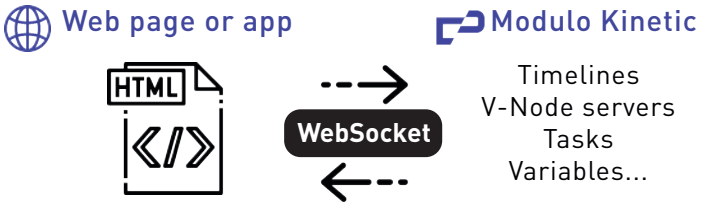
These solutions are introduced in the next pages.

Interactivity through web pages
for augmented experiences

Communication with web applications

Modulo Kinetic supports WebSocket, enabling seamless communication via this protocol. This allows the creation of **custom web applications that can interact with and control Modulo Kinetic.**

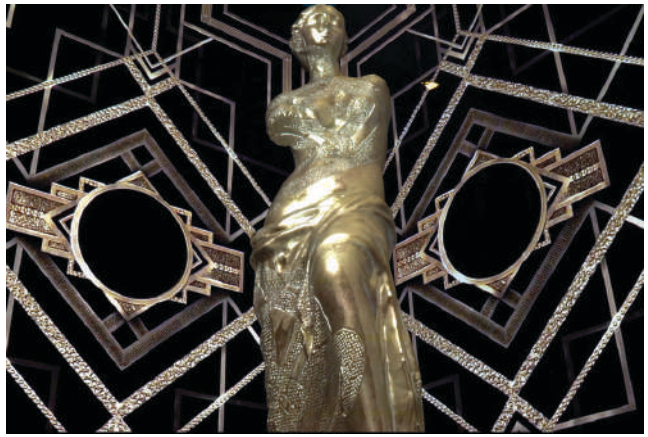
The **bidirectional communication** between your custom web application and elements in Modulo Kinetic include:



Personalized, interactive, augmented experiences

Once you have created your custom web pages or applications, **you can interact with a show powered by Modulo Kinetic from a smartphone, a tablet, a touch screen, or any other computing device.**

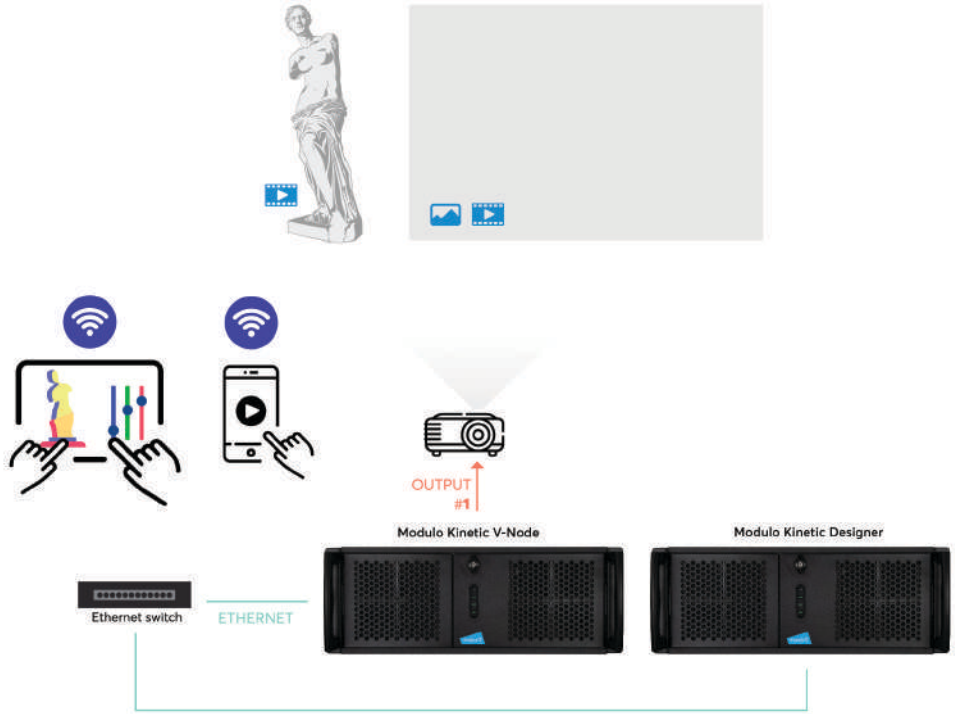
This flexible approach to easily trigger elements of a Modulo Kinetic project - media, lights, audio... - enables **personalized augmented experiences in the field of museography, theme parks, and live events.**



Demo

Interactive museum installation with touch screen and mobile phones

See full application note



Interactivity through physical devices
to engage the audience

Modulo Kinetic supports a wide array of sensors that can be used in the design of interactive experiences. These devices represent a cost-effective solution to add interactivity to a project.

RFID chipping

Use RFID wristbands or add RFID tags in objects to easily and automatically trigger tasks based on detection.

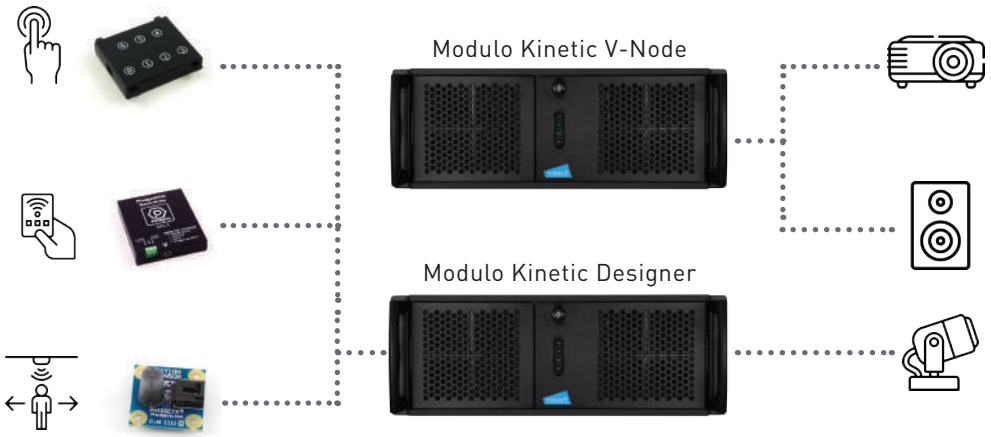
Library of Phidgets devices

Modulo Kinetic's library of external devices includes **+40 USB sensors by Phidgets**. These cost-effective sensing and control devices are easy to install and use.

A large variety of them are supported including:

- Rotating knobs
- Touch wheels
- Touch keypads
- Thumb sticks
- Position controllers
- Accelerometers
- Distance sensors
- Magnetic sensors
- Sound sensors
- Light sensors
- Humidity sensors
- Temperature sensors, and much more.

+40 USB Phidgets



One can easily create tasks in Kinetic Designer that will trigger automatically depending on the Phidgets' variables such as temperature, humidity, lux level, distance...

Demo

Easy interactivity through the Digimap function

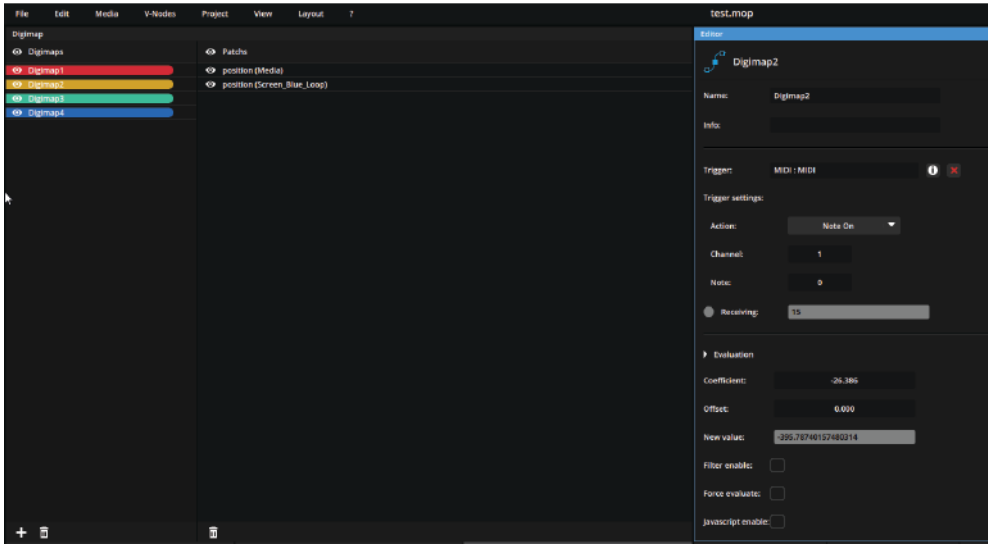
Simple tracking and interactivity can be achieved using Modulo Kinetic's Digimap function.

The Digimap function allows to **easily work with external devices (OSC, Art-Net, MIDI, TCP/IP rotary encoder, K2 motion control console by Kynesis...)** to:

- Control parameters of a media incl. position, rotation, opacity, color...
- Control parameters of a 3D node incl. position, scale, rotation...

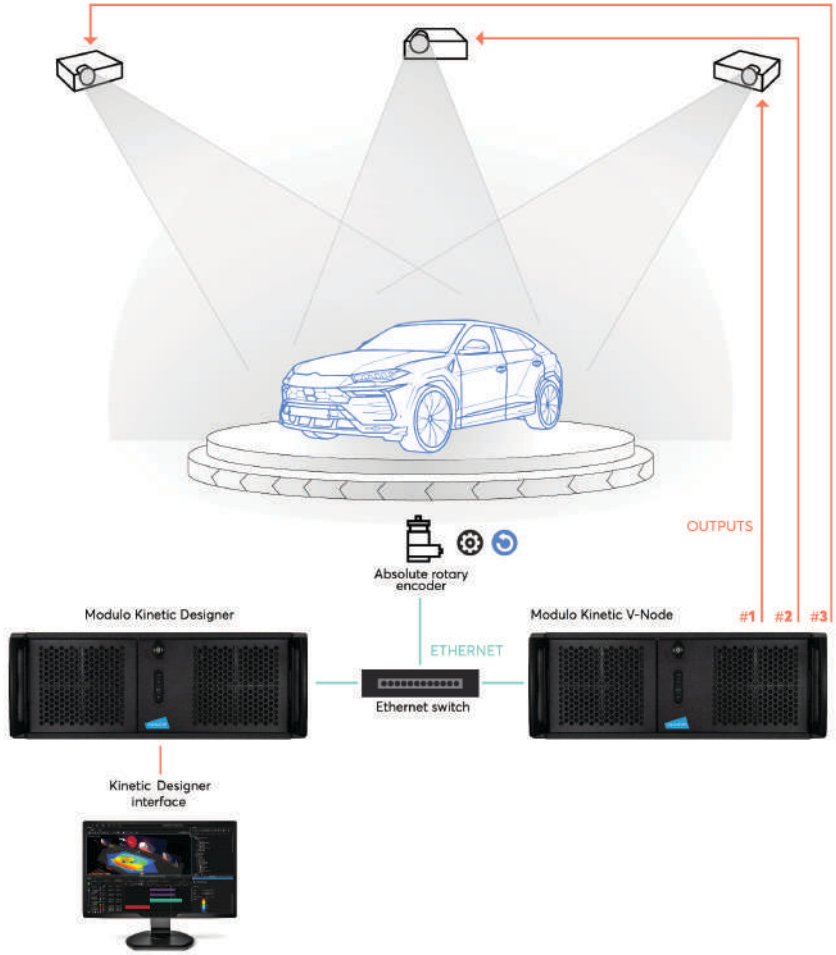
As an example, you can project on a moving screen on stage and have the projection perfectly mapping the position of your screen.
You can also change the layer opacity from a lighting console, control your show from a custom OSC control panel, etc.

Modulo Kinetic's wizard allows easy and quick calibration of the incoming data, so that you can link it to your media parameters.



Projection on a moving car with Digimap function

See full application note



Interactivity based on cameras and scanners
to enliven shows

Seamless communication with photo cameras and scanners

Modulo Kinetic supports new devices:

Canon EOS cameras

Image scanners
compatible with the 32-bit
and 64-bit TWAIN protocol

TWAIN

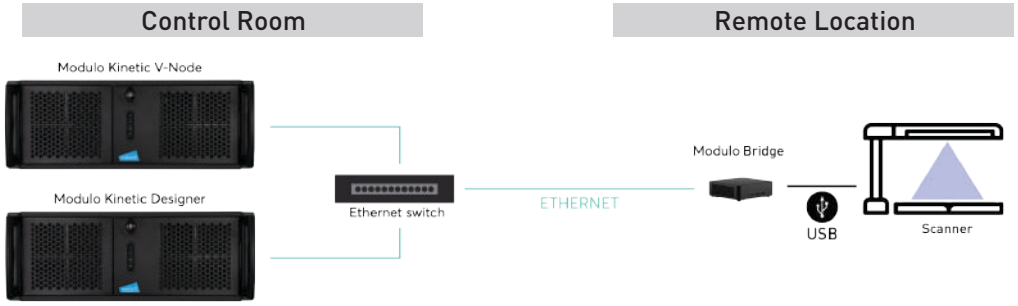
A turnkey solution to inject user-generated content

With support for these devices and its nodal programming tool (as detailed next), **Modulo Kinetic can capture and extract a photograph or scanned image, seamlessly integrating it into a live show in real time**.

Enabling remote connectivity with Modulo Bridge

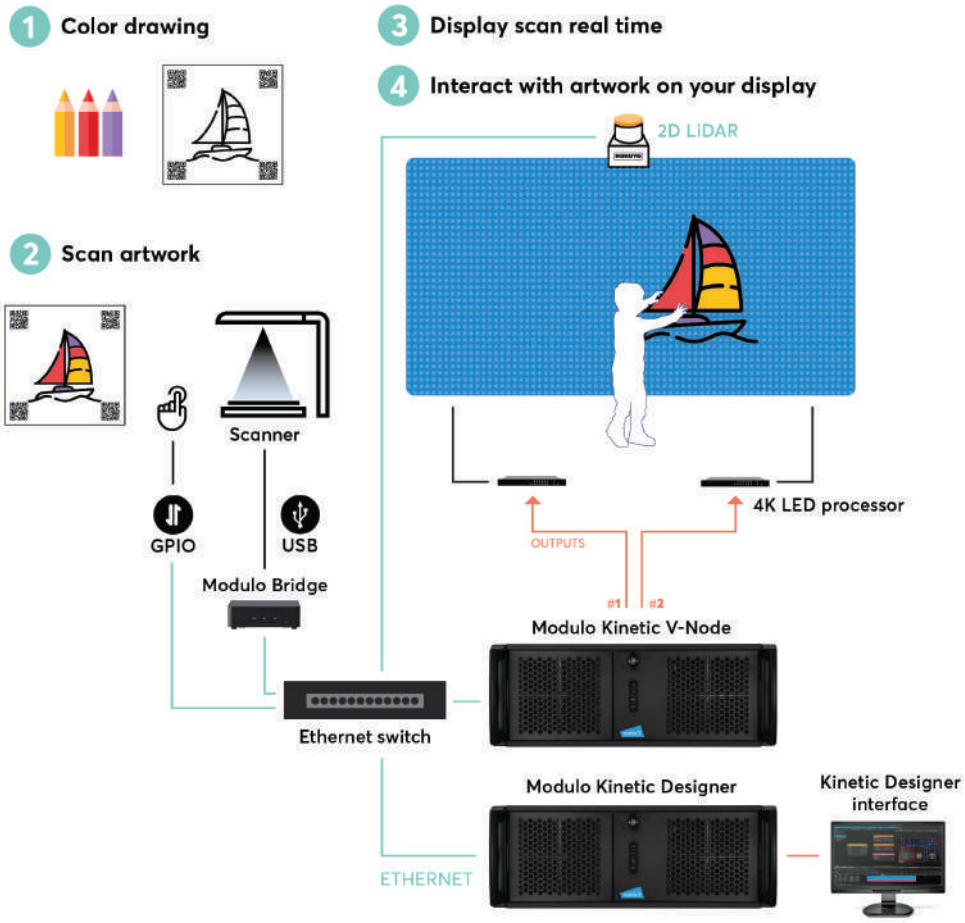
Since cameras and scanners used for interactive experiences are often positioned in the audience area - far from the control room - Modulo Pi provides **Modulo Bridge**.

Modulo Bridge is a compact device that creates an **Ethernet connection between USB devices and Modulo Kinetic Designer, enabling seamless communication over long distances.**



Interactive LED wall with live artwork scanning & display

See full application note



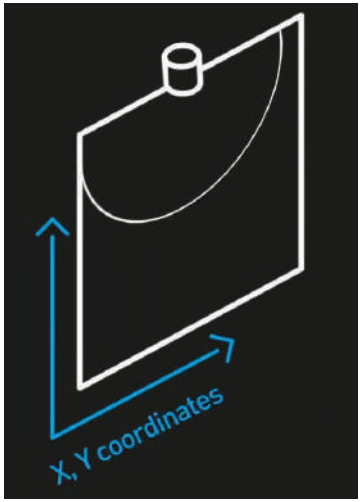
modulo KINETIC

Interactivity through touchless devices
for a flawless experience

For gesture-based interactions with simultaneous users, Modulo Kinetic supports 2D & 3D LiDARs (Light Detection and Ranging).
Such technology opens scalable interaction possibilities on walls, floors, or table tops, with the advantage of not having to equip the audience with physical sensors.

2D LiDARs

This type of laser emits a single beam of light on one axis. 2D LiDARs can be used to **detect and track hands or objects on one plane (walls, table tops...)**.



Several brands and models are supported by Modulo Kinetic with varied scanning and measurement ranges.

Demo

Leuze electronic

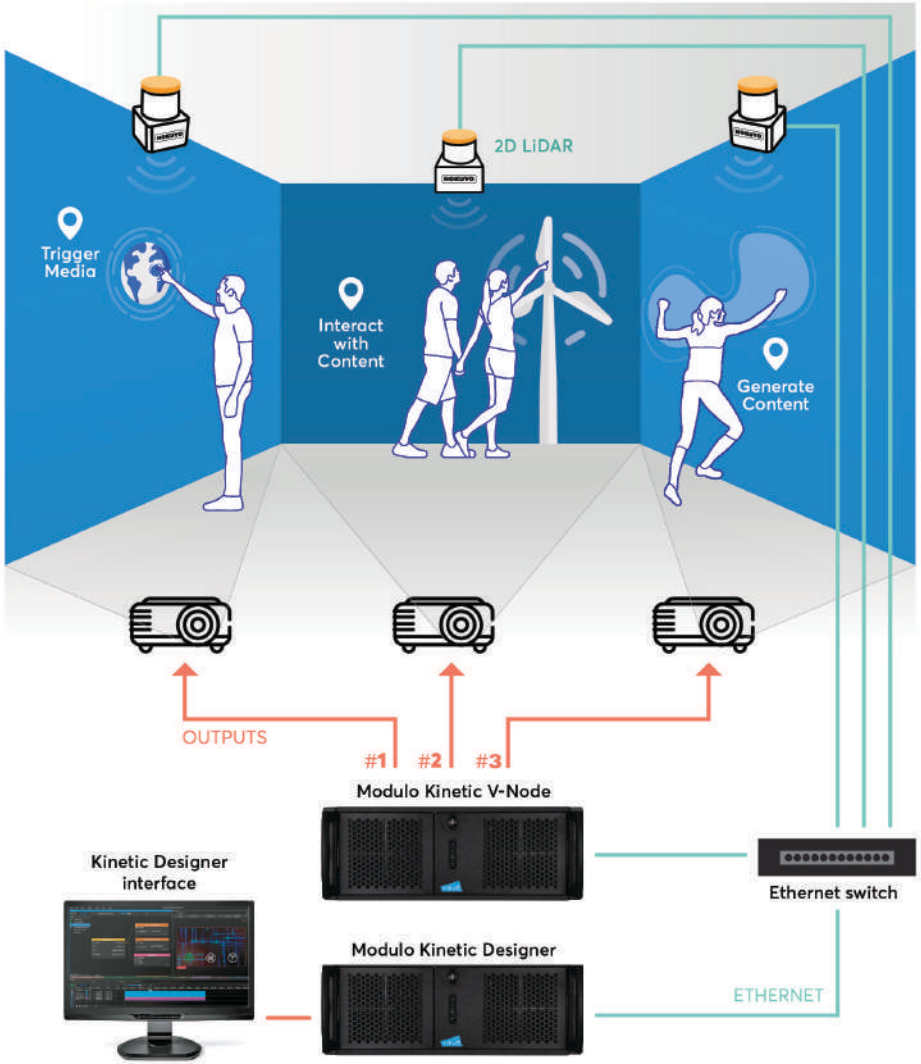
ROD4 series
Up to 65m (213ft)

HOKUYO

UST-05/10/15/20/30LX
5m to 30m (16ft up to 98ft)

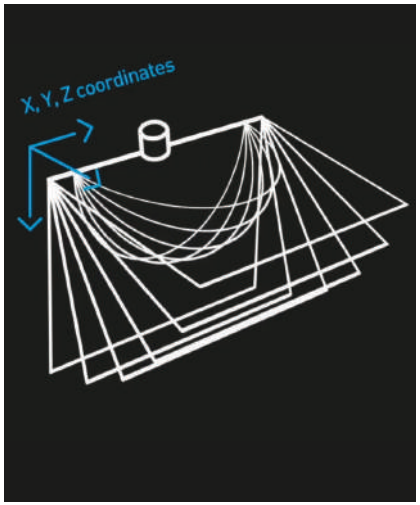
Interactive projection on walls with 2D LiDARs

See full application note



3D LiDARs

Those emit 128 invisible beams of light, allowing to collect a point cloud. They can be used to **track people or objects within a room**.



Modulo Kinetic supports different models so that you can select what is best for your project.

Demo

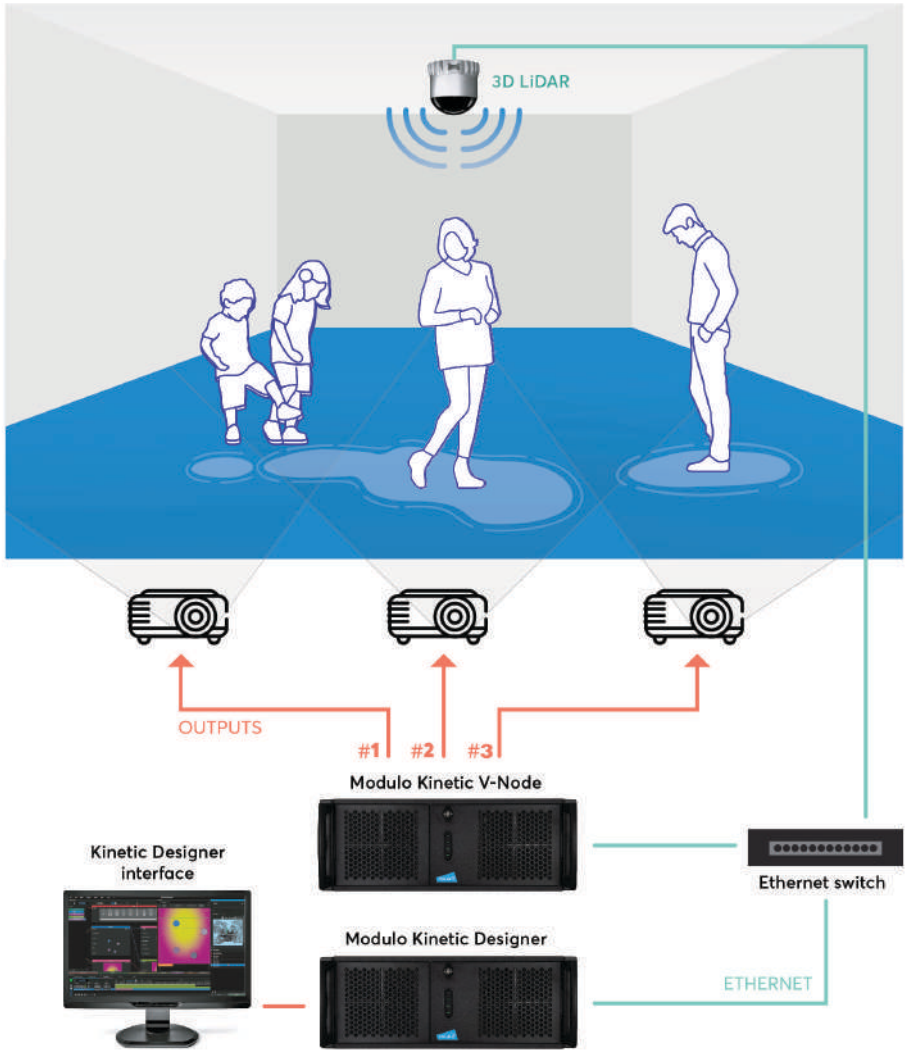
OUSTER

OS0
90m range at 10%
45° vertical field of view

OSDome
20m range at 10%
180° vertical field of view

Interactive projection on floor with 3D LiDARs

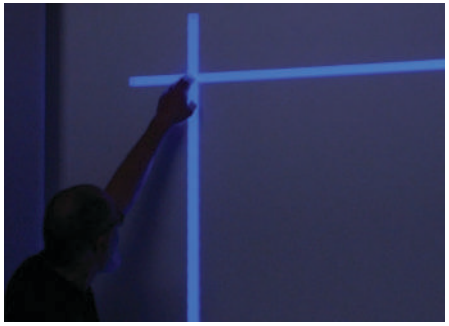
See full application note

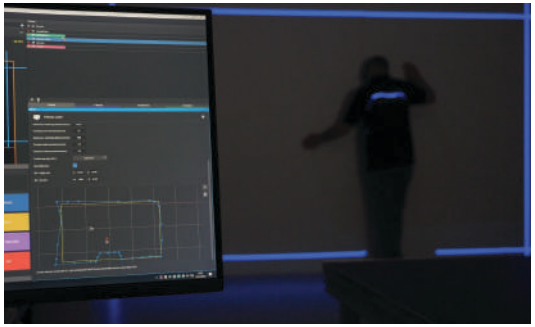


Interactivity through touchless devices
for a flawless experience

Easy calibration

All sensors supported can be **calibrated in seconds directly in Modulo Kinetic**. Simply add guides to your region of interest and point each corner. The sensor data is then converted into pixel coordinates.



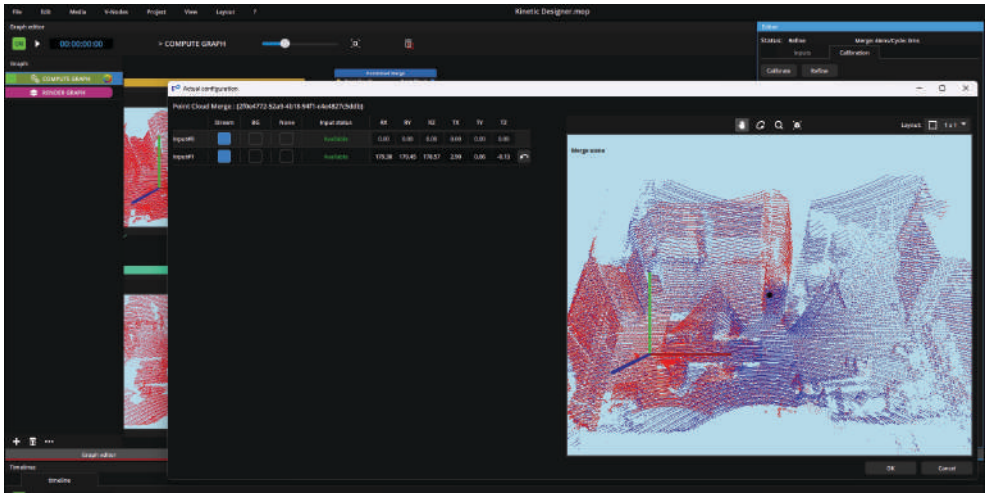


Once the calibration is complete, you get a table of persons or objects tracked.

Merge sensors for advanced setups

For setups combining interactive floors and walls, 2D and 3D LiDARs can be chained and merged.

For extra large venues, several 3D LiDARs can be used. Their respective point clouds will automatically merge.



Powerful intuitive tools, and a seamless workflow
to create your interactive projects

Modulo Kinetic embeds a **node-based programming environment.**

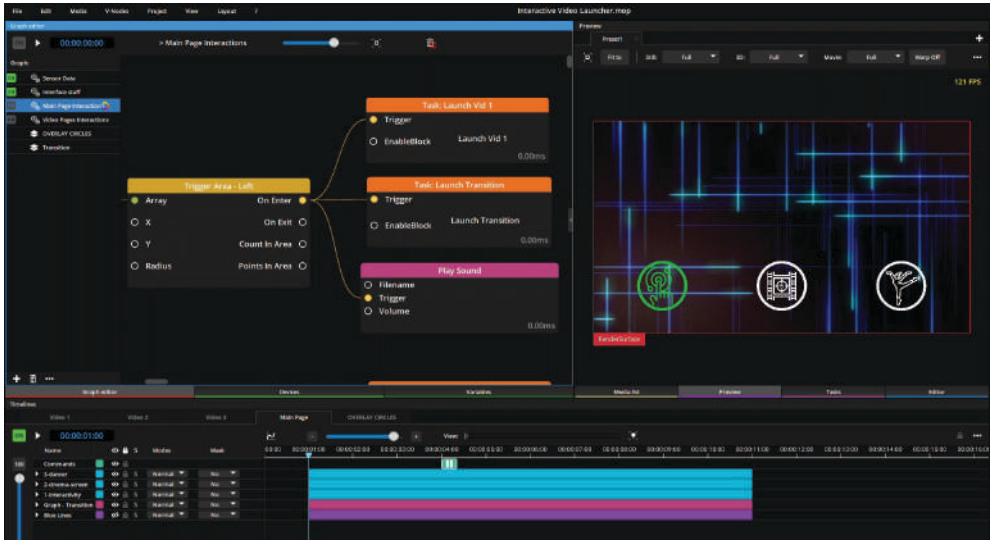
Using the Graph Editor, a variety of nodes can be linked together to create a wide range of interactions. Based on this intuitive and logical approach, highly sophisticated creations can be achieved without having to go through long and complex coding operations.

Compute Graph nodes

With this type of nodes, the **incoming data from sensors is used to modify parameters real-time**: Trigger a media, change position, color, rotation...
This type of node is CPU based and runs on the Kinetic Designer station.

Here is an overview of the blocks you can connect in the Graph Editor:

- A device incoming or outcoming data
- A media layer parameter such as opacity, position, or scale
- A media fx parameter
- A 3D object parameter such as a node, light, camera, material...
- A particle parameter
- A task
- A variable



Render Graph nodes

In this case, you will compose your own interactive effects using Modulo Kinetic. The media server embeds a 3**D engine for generative content, and an ever-growing internal library of effects** including blur, fluid, noise, twirl, spray paint, metaball, and many more.

Using the nodal editor, the effects can be linked and chained to create unique outcomes. Such visual FX are GPU based and run on V-Node servers.

Follow our tutorials and learn how to create Compute and Render Graph nodes step by step:

Compute Graph
for an interactive video launcher

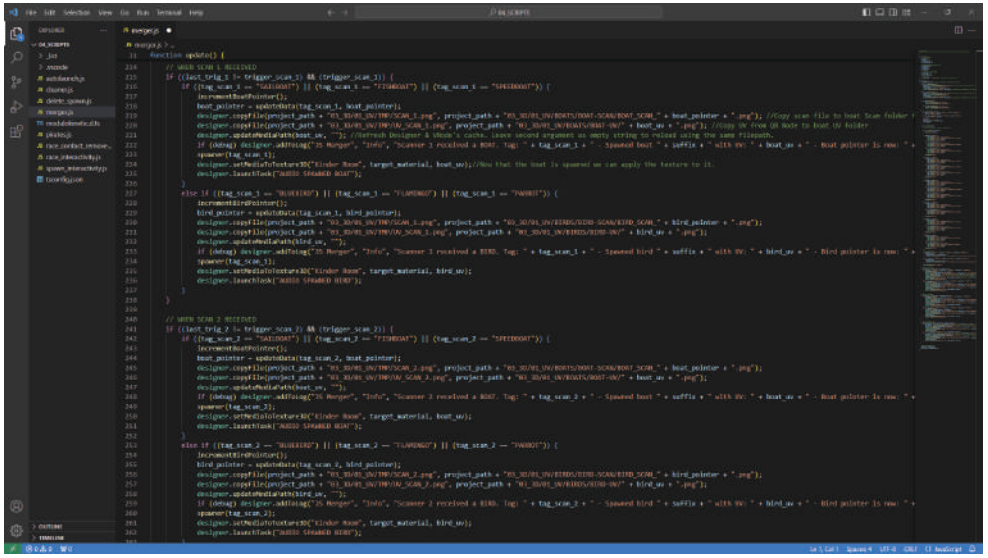
Render Graph
for interactive media reveal

Powerful intuitive tools, and a seamless workflow
to create your interactive experiences

JavaScript coding for specific requirements

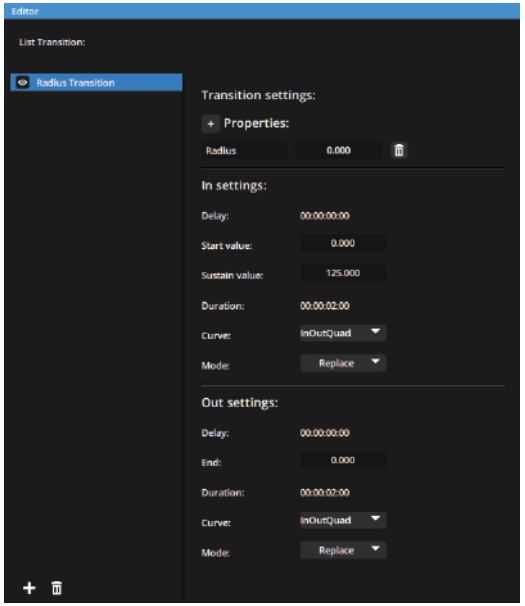
For specific custom blocks, users are empowered to go further using JavaScript with their preferred integrated development environment.

The code editor offers syntax highlighting making the coding process more intuitive and efficient.



Transition effects

In/Out transitions can be created and added to interactive effects in order to produce a smooth user experience.
All parameters can be adjusted and added to the nodes of your choice.



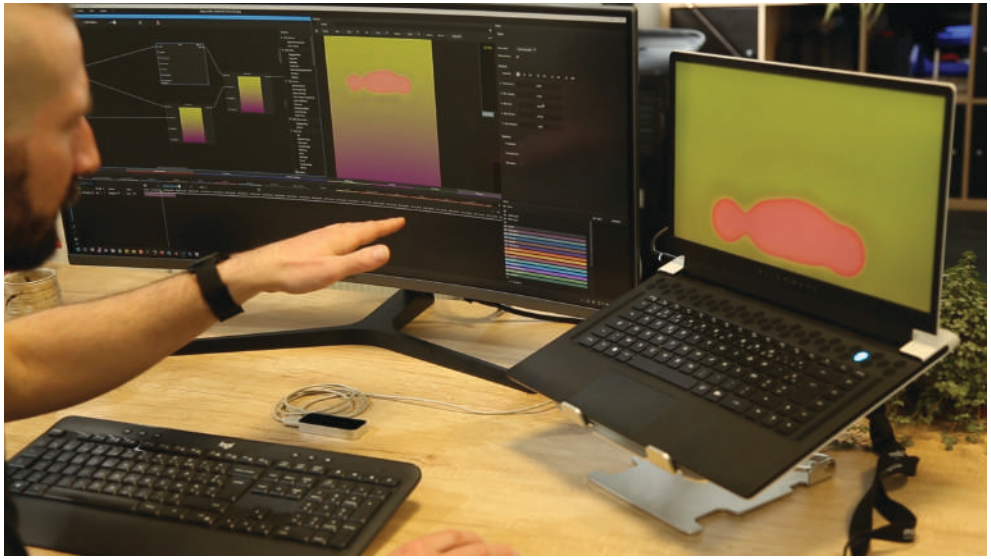
A smooth collaborative workflow

To save time and maximize efficiency, a project can be easily split between the creative and technical teams.

Both teams can work offline through a light setup with a simple laptop, a **Modulo Pi dongle** equipped with the **Kinetic Designer 2D+3D license**, plus a **Leap Motion Controller 2 by Ultraleap** for the creative team.

Supported by Modulo Kinetic, the Leap Motion controller provides hands & fingers tracking. **The device can be very useful for prototyping an interactive experience involving 2D and/or 3D LiDARs.**

Hands tracking will help simulating an audience and you will enjoy a **real-time previz of your interactive effects** in the Kinetic Designer interface.



Once the interactive project is complete, the show can be easily exported and sent to the team working with the Modulo Kinetic media servers for the merge.

The interactive graphs can be easily imported in the final project, and the Leap Motion controller simply replaced by the sensor used on-site. Effects will automatically scale to match the real-world scale.

Find out more about the workflow of Modulo Kinetic with 2D/3D LiDARs and access different interactive demos:

Watch Demos

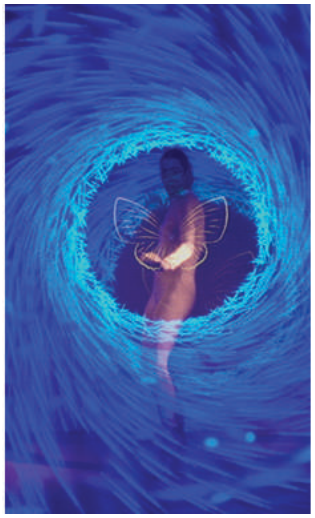
KineMotion tracking module
for creative and interactive visual experiences

KineMotion, the real-time tracking system by Modulo Pi

Available as an option, KineMotion is an **optical tracking solution** instrumental in creating state-of-the-art visual experiences:
Dynamic projection mapping, interactive video effects, automatic follow spot, spatial audio, and more.

Modulo Kinetic & KineMotion offer ultra-low latency to meet the needs of the most challenging configurations such as:

- Dynamic projection mapping on 3D moving objects in real time
- Advanced real-time 3D edge blending
- Real-time 2D fx interacting with beacon position
- 3D real-time particles interacting with beacon position
- Automatic follow spot: Beacon position sent to light desk through PSN
- Spatial audio: Beacon position sent to L-Acoustics' L-ISA system



PROJECTION · VIDEO EFFECTS · LIGHTING · SPATIAL AUDIO

All the calibration steps are integrated in Modulo Kinetic:

- Easily calibrate the infrared camera system
- Set a 3D world reference
- Fully auto-calibrate the video-projectors using the same cameras

See KineMotion datasheet

Demo

KineMotion kit:

> Add-on software for Modulo Kinetic Designer
> Calibration toolset: Wand, square & travel case
> Beacons + 8 LEDs 1.8m cable with reflector
> Active synchro RF box
< Not included: OptiTrack tracking cameras

Modulo Kinetic is also compatible with other tracking and motion control solutions such as BlackTrax or Kinesys.

modulo KINETIC

Software + Hardware designed & manufactured
for the highest performance and reliability

Delivering as promised

To ensure utmost reliability, our media servers come as hardware + software solutions.
Our platforms are based on **strictly qualified GPUs and components**.
Modulo Pi is a technology partner of leading manufacturers of graphic cards and live input boards. All our systems are running on Windows 11 CBB 64 bits [1].

Modulo Kinetic is available in two different enclosures:

Regular chassis

Ruggedized chassis: Features a reinforced suspended framework and professional connectivity to endure rough conditions.

[1] *As of September 2024. Prior models running on Windows 10 SAC 64 bits*

Made in France

Our software is fully developed in-house. Based nearby Paris, our team of developers keeps on updating and improving our media servers.
In addition, **our hardware is fully assembled and tested in our offices before shipping.**

Customizable configurations

To meet your specific requirements, Modulo Kinetic is available in different hardware configurations which can all be customized: Add a timecode card, a live capture card, additional storage capacity...

Modulo Kinetic datasheet
Modulo Kinetic Ruggedized datasheet

Customizable hardware configurations
to adapt to your needs and budget

REFERENCES	OUTPUTS	SSD	OPTIONAL CAPTURE CARD
Kinetic DESIGNER			
KI-DES		250 GB + Fast NVMe PCIE 2 TB	
Kinetic DESIGNER - Ruggedized			
RKI-DES		250 GB + Fast NVMe PCIE 2 TB	
Kinetic V-NODE			
KI-VNO-1	1 output 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
KI-VNO-2	2 outputs 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
KI-VNO-4	1 output 4K or 4 outputs 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
KI-VNO-6	1 output 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
KI-VNO-2x4K	2 outputs 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 4 TB	✓
KI-VNO-3x4K	3 outputs 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 4 TB	✓
KI-VNO-4x4K	4 outputs 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 4 TB	✓
Kinetic V-NODE - Ruggedized			
RKI-VNO-1	1 output 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
RKI-VNO-2	2 outputs 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
RKI-VNO-4	1 output 4K or 4 outputs 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
RKI-VNO-6	1 output 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 2 TB	✓
RKI-VNO-2x4K	2 outputs 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 4 TB	✓
RKI-VNO-3x4K	3 outputs 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 4 TB	✓
RKI-VNO-4x4K	4 outputs 4K or 6 outputs 2560x1600	250 GB + Fast NVMe PCIE 4 TB	✓

New upgraded hardware

As of 2022, Modulo Kinetic comes with a new hardware. The upgrade significantly improves the servers' performance. It includes [1]:

- Bigger RAM (up to x8)
- Doubled bandwidth with PCIE 4.0
- New GPU generation
- New server motherboards
- Additional slots for live input boards

[1] Depending on model.
For more details, please consult the technical datasheets.

OPTIONS

REFERENCES	
KineMotion	
KM-SOFT	KineMotion add-on software for Modulo Kinetic Designer
KM-CALIBTOOL	KineMotion calibration toolset: A calibration wand, a calibration square, and a travel case
KM-BEACON	KineMotion Beacon + 8 LEDS 1.8 meter cable with reflector
KM-SYNC	Active synchro RF box
Auto-calibration	
AUTOCAL-1-OUT	Multi-projector auto-calibration module per output
AUTOCAL-LUCAM	PoE camera with 1 x 15m cable (LUCID)
AUTOCAL-FILENS	High resolution fish-eye lens (FUJINON)
AUTOCAL-8LENS	High resolution 8 mm lens (FUJINON)
AUTOCAL-CASE	Travel case with custom inserts for 1 x PoE camera, 15m cable, auto-calibration dongle, and up to 2 lenses (FUJINON)
Boards and TC	
DELTA-2x3G	Live Capture: 2 x 3G SDI
DELTA-1x12G	Live capture: 1 x 12G SDI + 2 x 3G SDI or 4 x 3G SDI
DELTA-2x12G	Live Capture: 2 x 12G SDI + 4 x 3G SDI or 8 x 3G SDI
DELTA-6x12G	Live Capture: 6 x 12G SDI or 12 x 3G SDI
DELTA-2xHDMI	Live Capture: 2 x HDMI 2.0
DELTA-MIXED	Live Capture: 4 x 3G SDI + 1 x HDMI 2.0 or 2 x 12G SDI + 1 x HDMI 2.0
DELTA-HOST [1]	Flex Host Card [1]
MOD-HDMI [1]	Flex Module single HDMI 2.0 [1]
MOD-DP [1]	Flex Module single DP 1.2 [1]
MOD-SDI4 [1]	Flex Module 4 x SDI 3G [1]
TC-PCIE-R	Timecode card reader
TC-PCIE-RW	Timecode card reader writer
TC-USB-R	Timecode card - USB
Miscellaneous	
MOD-BRDG	Modulo Bridge, network bridge hardware for USB devices

[1] Option limited to ruggedized models

modulo π

Two turnkey solutions
All your needs covered

modulo PLAYER

More than a Media Player

A cost-effective media server ideal for your everyday projects

- Flexible Playlist management
- Advanced 2D mapping through our exclusive X-Map function
- Embedded low-latency Live Mixer **| INDUSTRY FIRST |**
- User-friendly tools for Interactivity
- Multi-projector Autocalibration module **| BY MODULO PI |**
- Easy, yet powerful Show Control
- User Interface Designer to easily create your own UI
- True multi-user mode for optimized setup and operation
- Available in 4 customizable hardware configurations

modulo KINETIC

More than a Media Server

The ultimate video solution tailored for your most challenging projects

- Non-linear, real-time timelines editing with keyframes
- Embedded low-latency Live Mixer **| INDUSTRY FIRST |**
- Advanced 2D & 3D warping tools incl. exclusive X-Map function
- Multi-projector Autocalibration module **| BY MODULO PI |**
- Real-time 3D engine with generative content, incl. particles
- Real-time study and simulation in 3D & VR
- 3D video-projector calibration
- Flexible node-based programming
- Easy, yet powerful Show Control
- User Interface Designer to easily create your own UI
- Powerful tools for interactive experiences **| NEW |**
- KineMotion, powerful optical tracking module **| BY MODULO PI |**
- Dedicated tools for Virtual Productions with AR & XR
- True multi-user mode for optimized set-up and operation

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modulo π