វិទ្យាស្ថានបច្ចេកវិទ្យាកម្ពុជា

Khmer Geographic Institute

KHmer Earth OBServation (KHEOBS) Laboratory

ITC Since 1964 - KHEOBS Since 2022

To manage a better world.

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Groupe ATGT

Photogrammetry - LiDARgrammetry - 3DGS

Since 2014

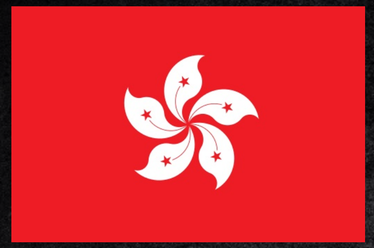
To manage a better world.

Groupe
ATGT

ATGT Géomètre - Expert - ATGTSM
ATGT Topo3D - ATGT Ingénierie
ATGT Tunisia - ATGT Ivoire
ATGT Canada- GEOS IMAGES
and KGI Cambodia

Since 1947

To manage a better world.



XGRIDS

Hong Kong (China)

Leading the world in
3D Intelligent Spatial Computing

Gaussian Splatting

Since 2020

To manage a better world.

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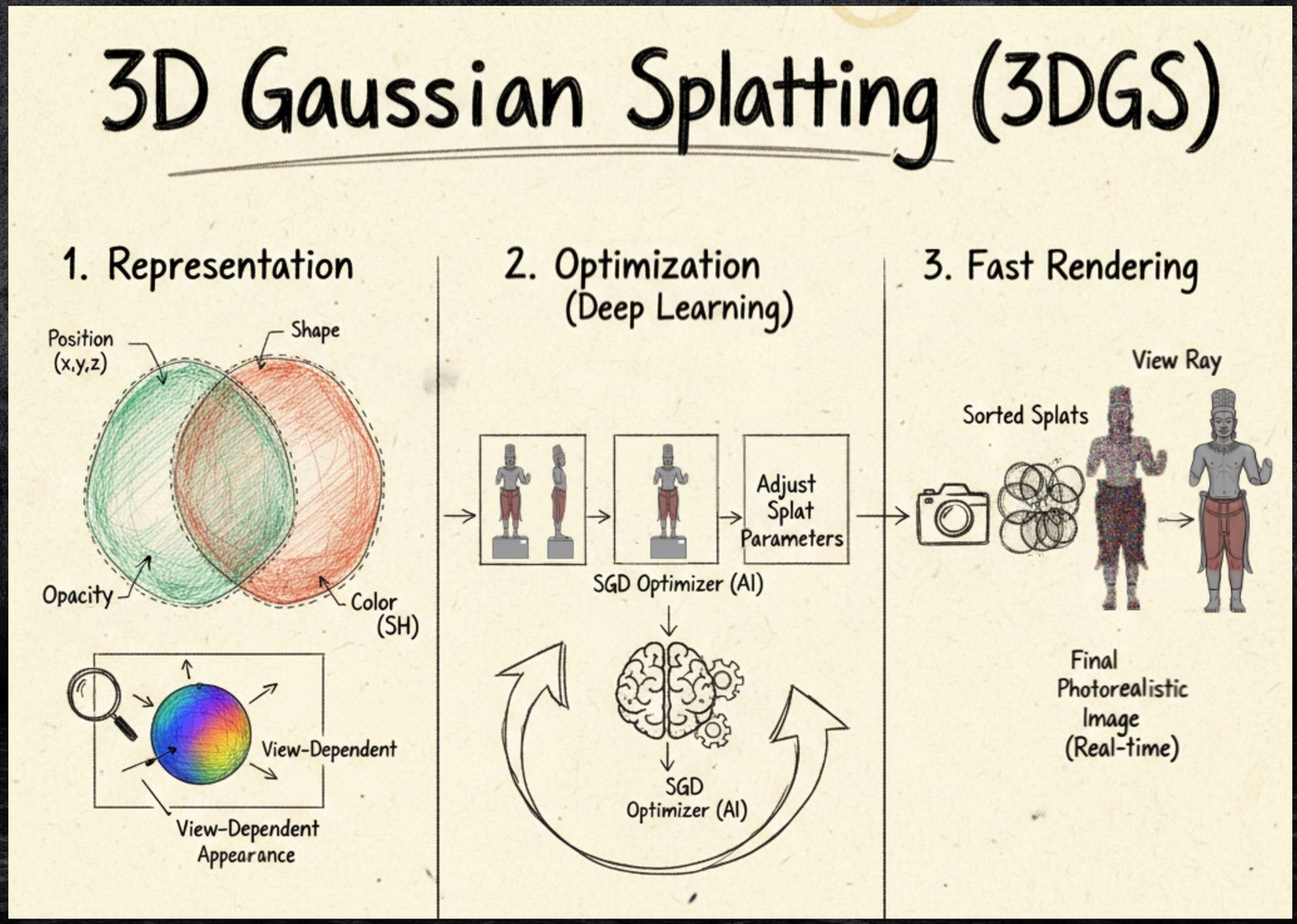
3DGS at glance

XGRIDS

Instead of using traditional polygons (triangles) to model surfaces, 3DGS represents a scene using millions of tiny, flexible elements called **Gaussian splats**, that are small, translucent, 3D ellipsoids.



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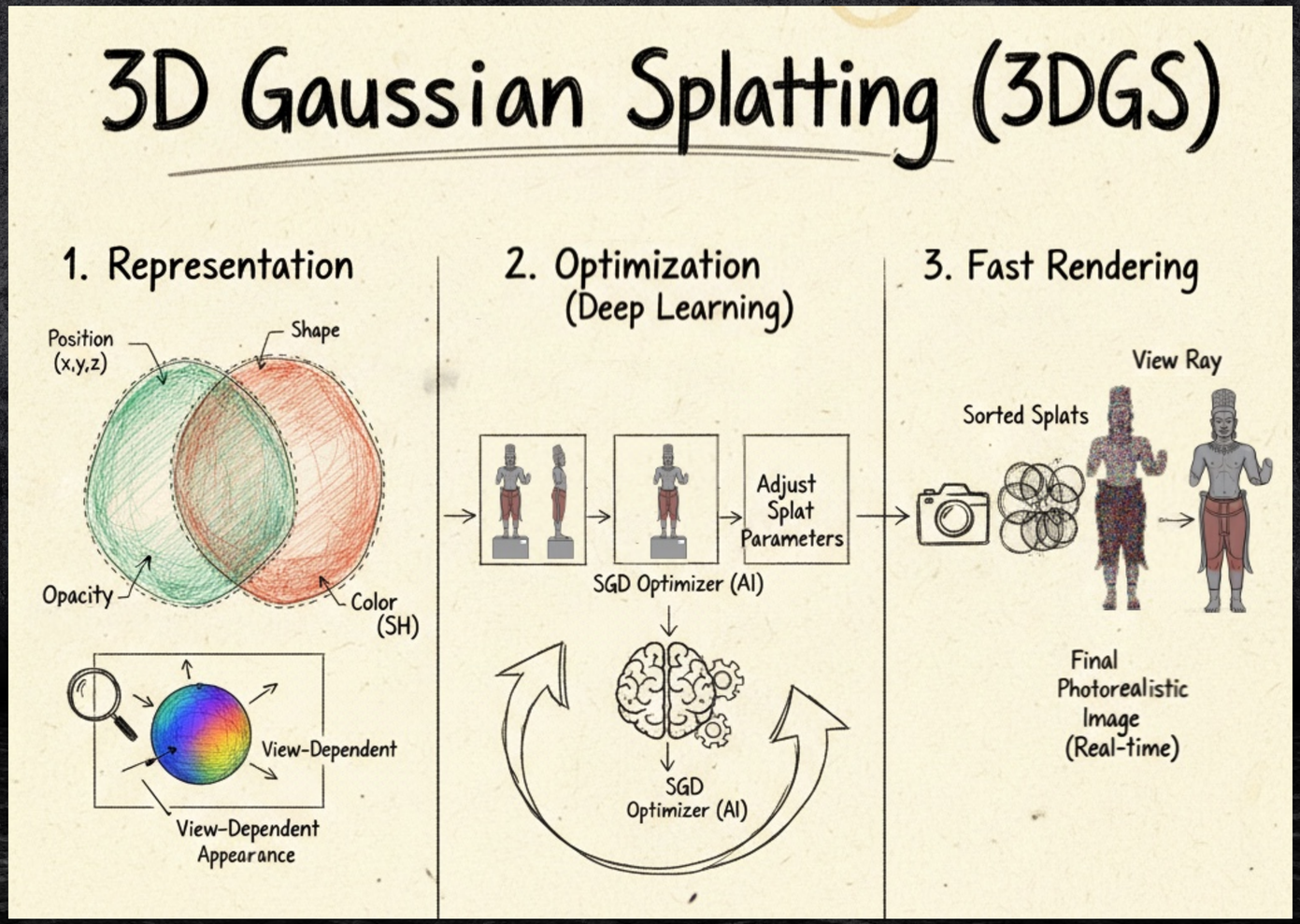
3DGS at glance

Scene Representation:

The scene is explicitly stored as a massive collection of **Gaussian splats** parameters:

- **Position:**
  Its location in 3D space.
- **Shape & Size (Covariance):**
  How stretched or scaled it is.
- **Opacity:**
  Its transparency level.
- **Color/Radiance:**
  Its appearance.



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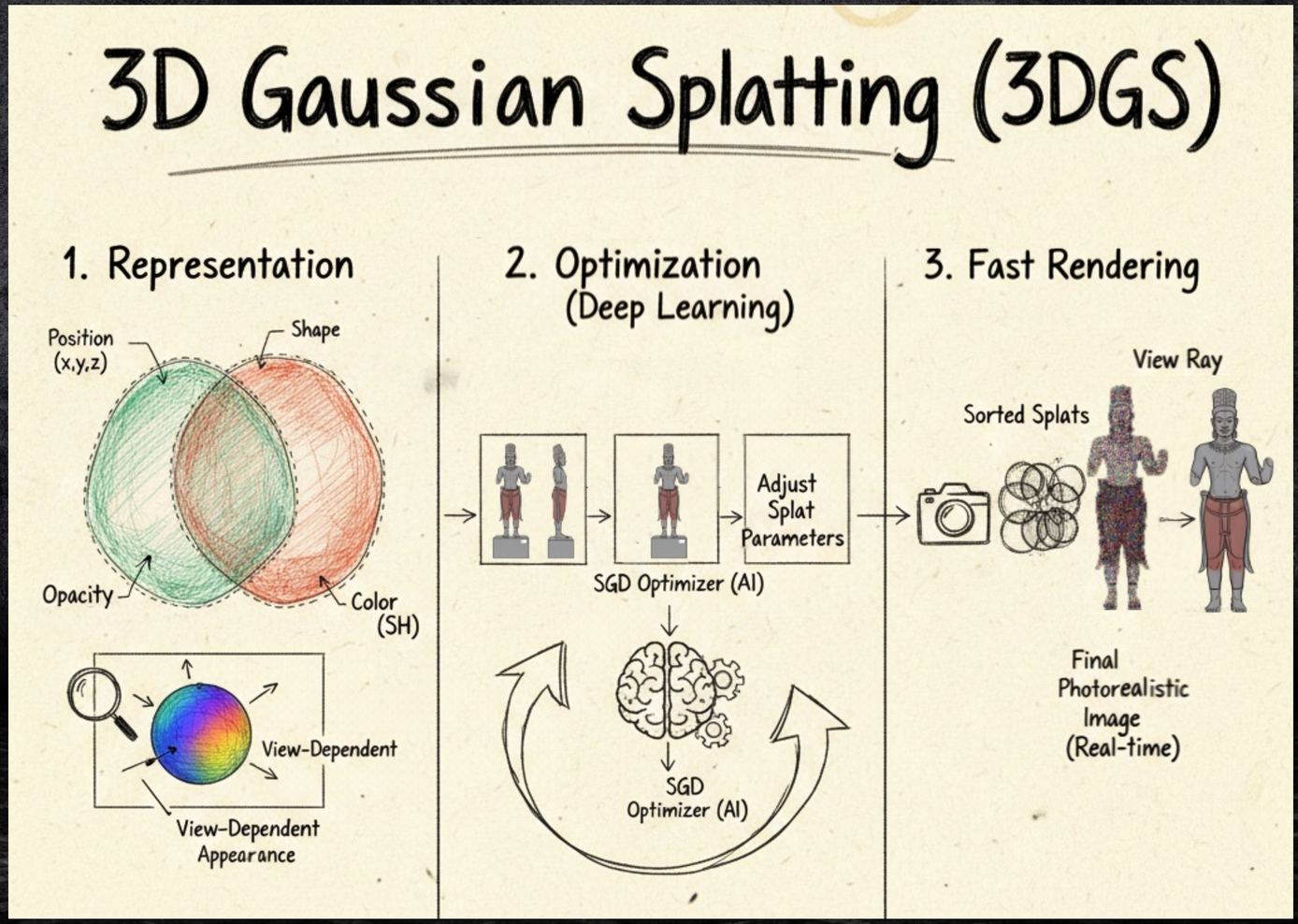
3DGS at glance

The Optimization Process (Deep Learning):

The parameters of all the millions of splats are fine-tuned using a core deep learning optimization technique called **Stochastic Gradient Descent (SGD)**. This process iteratively adjusts the position, shape, and color of every splat until the rendered scene perfectly matches the original input images from all viewpoints.



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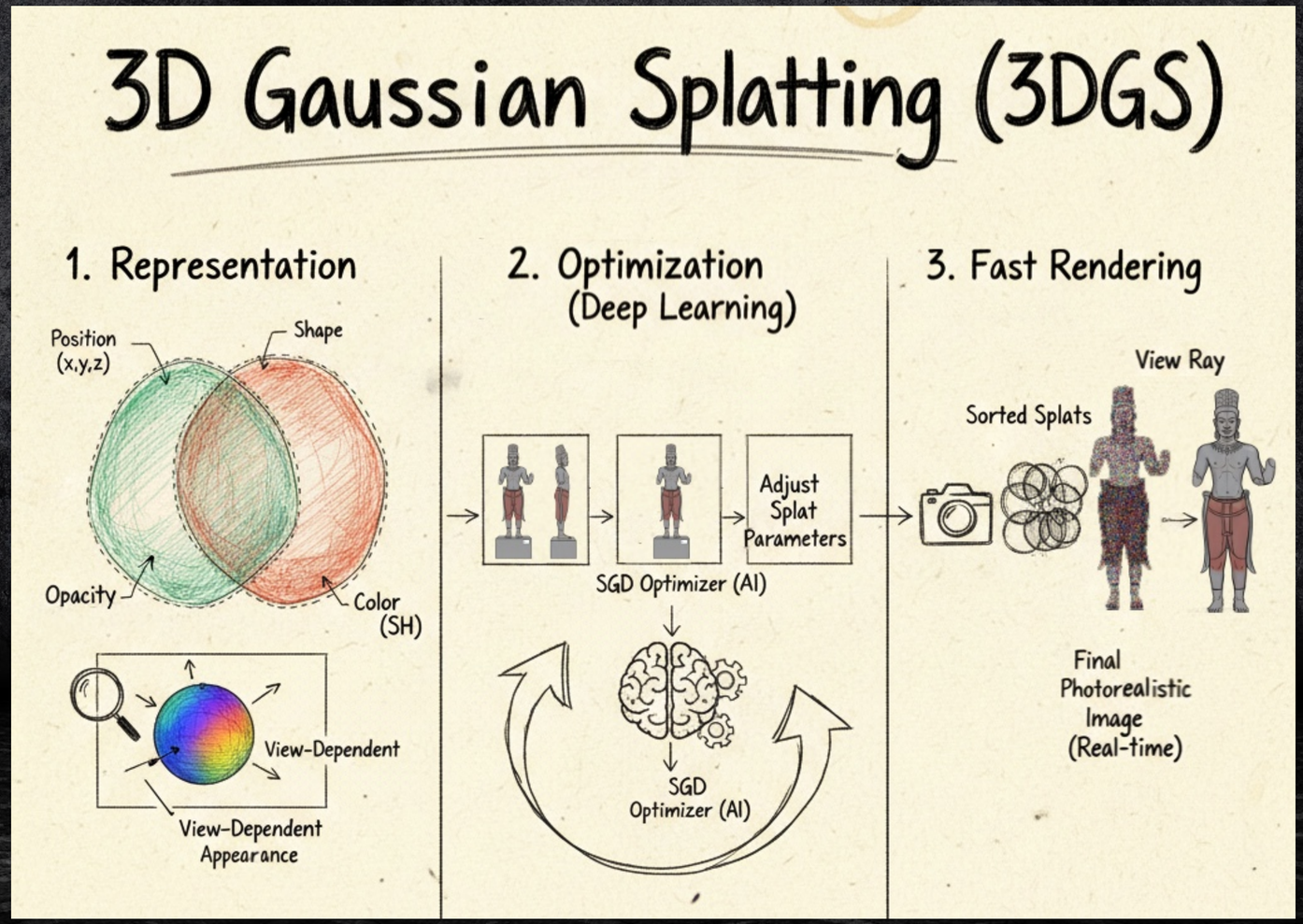
3DGS at glance

View-Dependent Color (Ray Information):

To capture realistic reflections, highlights, and subtle lighting changes, the color of each Gaussian is not fixed. Its appearance is encoded using **Spherical Harmonics (SH)** a mathematical function that defines how light is scattered. This ensures the color of the splat changes realistically based on the camera's angle (or **ray of view**), allowing for accurate modeling of shiny materials and glossy surfaces.



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Applications

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Cultural Tourism and Creative Industries

Online Viewing

—

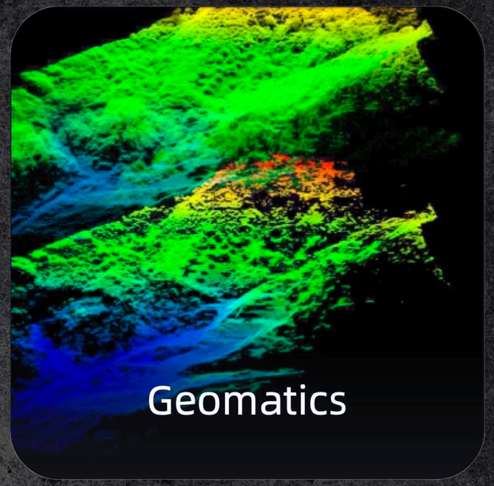
Tourist Attraction Management

—

Virtual & Real Interaction

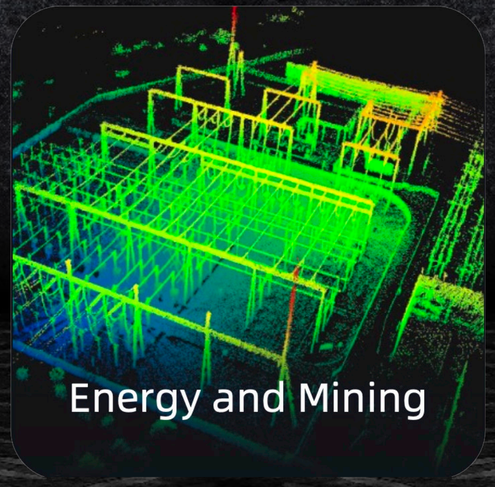
Centimeter-level restoration of scenic areas, architecture, and decorative details, providing visitors with an immersive viewing experience

Smart City



Geomatics

Metaverse



Energy and Mining

Emergency Security

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NATIONAL MUSEUM

3D Digital Twin project

Preservation - Culture - Education

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Capture workflow

360° object capture

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Capture workflow

360° object capture

Photos enhancement (no need with PortalCam)

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Capture workflow

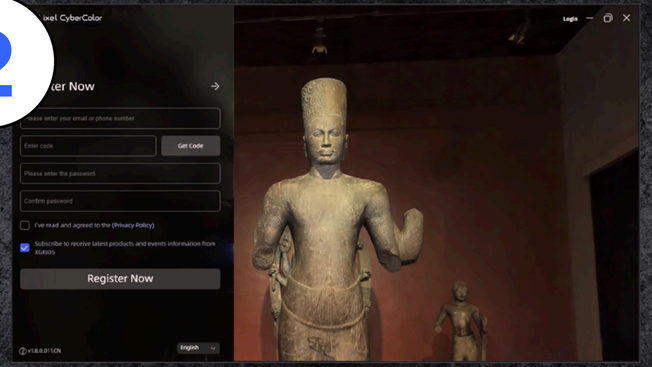
XGRIDS

1

Capture

Walk naturally while the XGRIDS device records.

2



Process

Generate 3D models with automatic processing in LCC Studio.

3

Apply

Edit, share, and integrate LCC models with existing workflows.

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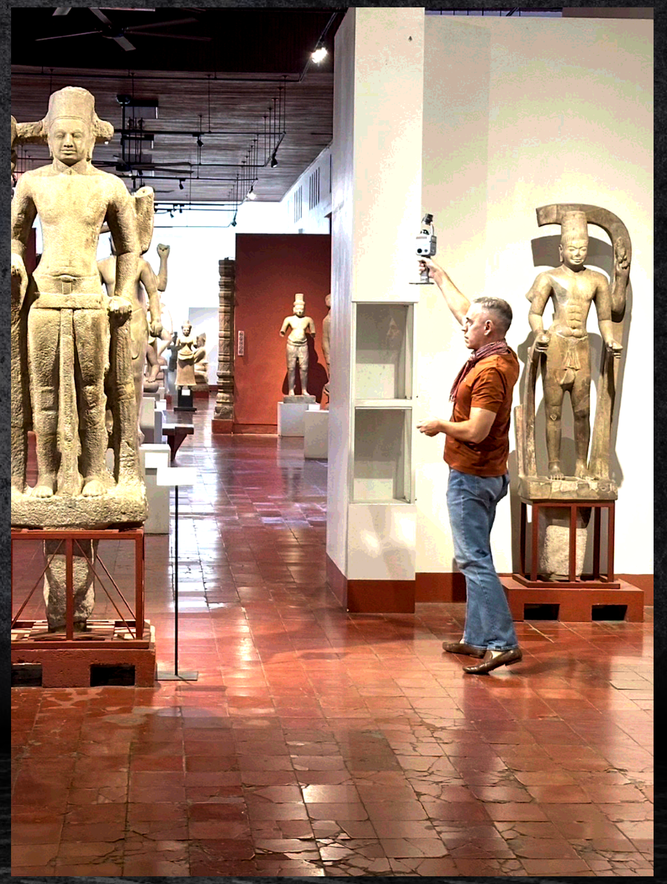
Capture workflow

360° walk trough



XGRIDS

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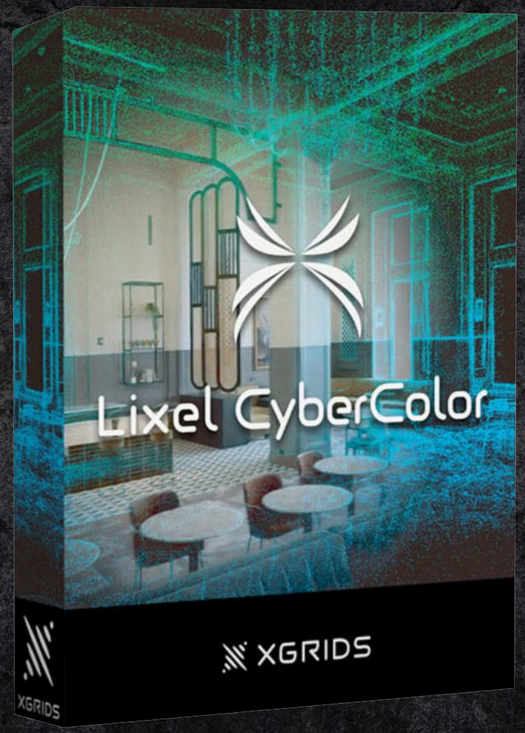
LCC rendering breakthrough

XGRIDS



- **Real-time** scanning and modeling device
- **Unlocking** the limitless potential of **3D data**
- Next-Gen 3D **Technology** Based on **Multi-SLAM & 3DGS**

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LCC rendering breakthrough

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Next generation 3D digital reconstruction technology

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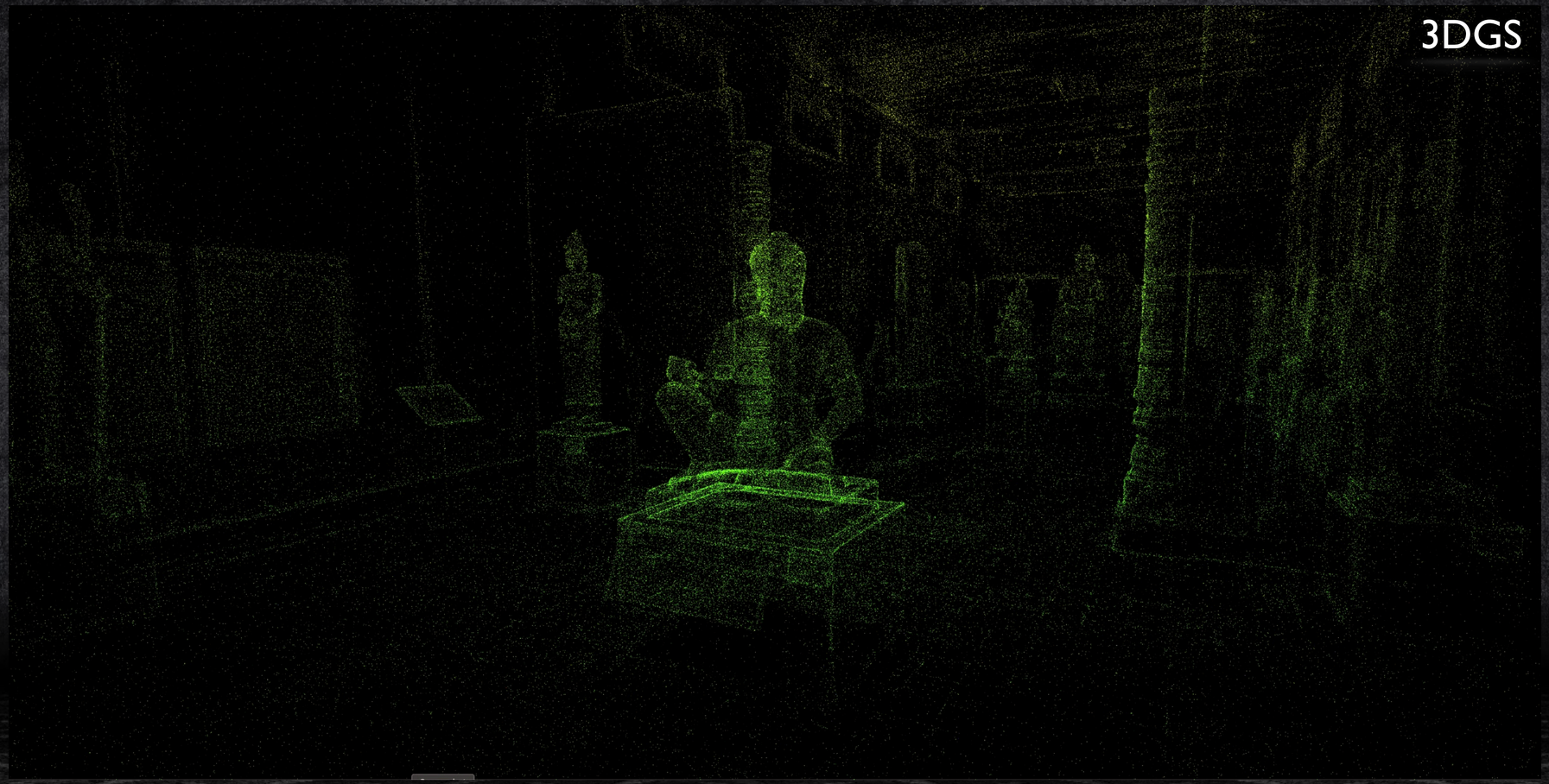
LCC rendering breakthrough

XGRIDS



Based on AI spatial computing, developed by XGRIDS

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LCC rendering breakthrough

XGRIDS

Unlocking a new-era of spatial immersive experience

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LCC rendering breakthrough

XGRIDS

Bringing you Pixel-perfect depiction of the real world

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LCC rendering breakthrough

XGRIDS

Across cloud, edge, and mobile platforms

With avatars or spacial computing equipments

You can experience the LCC 3D models

Unlocking unprecedented immersive interaction experiences

Developers, creators and operators are the driving force behind 3D

For platforms such as Autodesk, Unity, UE, and Web

Supporting Android, iOS, Windows, Mac, and more

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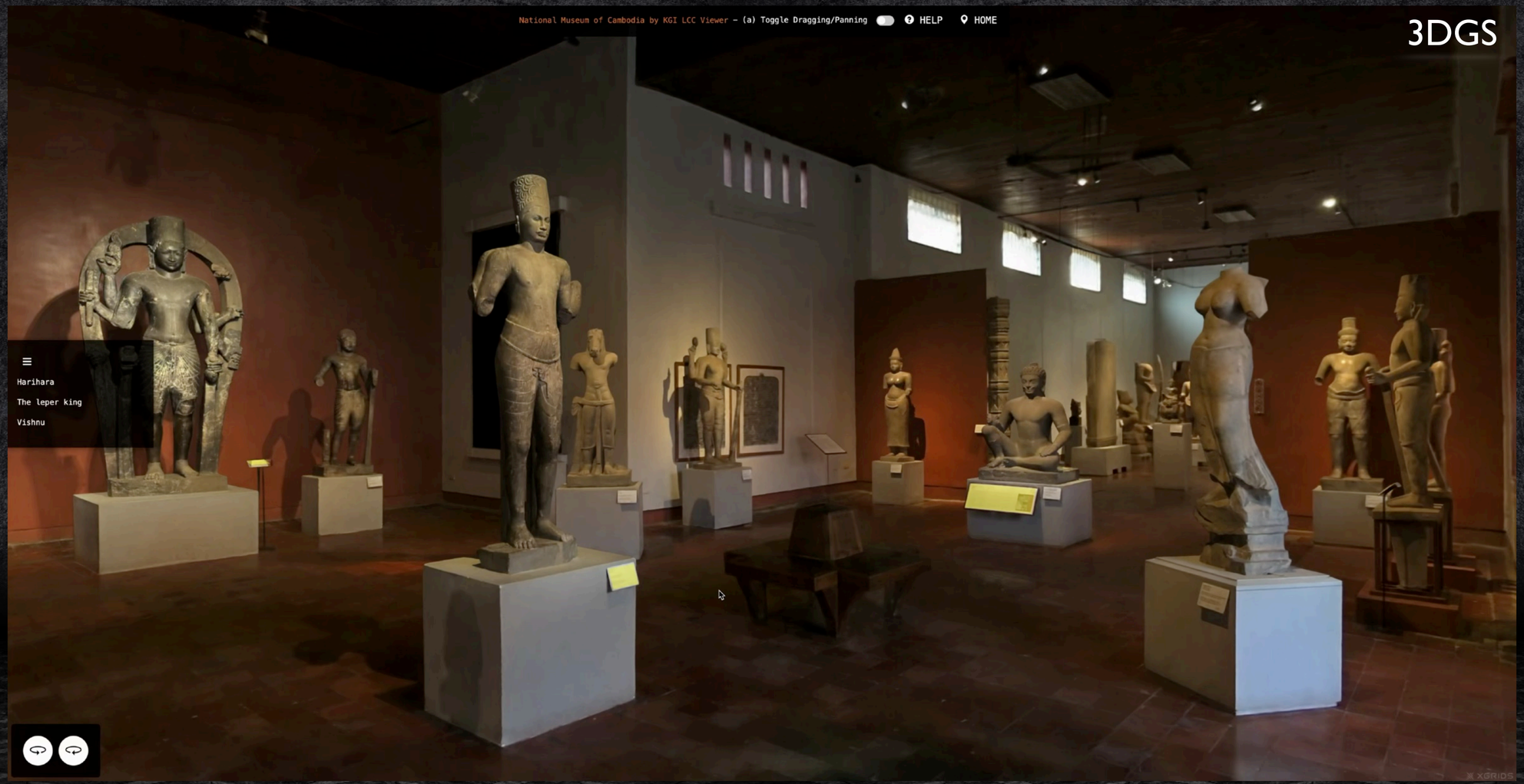
Real-life example

Experimental web portal of the National Museum of Cambodia



https://kgi.xyz/LCC/MN/national-museum-cambodia.html

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Real-life example

Phnom Penh First World War Memorial

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Real-life example

Angkor Wat

(aerial photos : JEB SURVEYS and ENGINEERING)

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Real-life example

The Gallery by Sofitel Phnom Penh Phokeethra

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Real-life example

Preah Norodom Boulevard

XGRIDS

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PortalCam

The First True Spatial Camera

XGRIDS

PortalCam captures real spaces as photorealistic 3D worlds.
Powered by 3D Gaussian Splatting, PortalCam turns any location into interactive spatial models you can walk through, edit, and share.

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PortalCam

Spatial high-definition details

XGRIDS

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PortalCcan

Spatial high-definition textures

XGRIDS

No need to add HD photos!

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PortalCam

Spatial high-definition objects

XGRIDS

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Thank you for your time

Music Credits : សម្លេងខ្មែរ - CAMBODIA, I HEAR YOU CALLING [Official Visualizer]
Lead Vocals: Monetrey Ek - មន្ត្រីយ៍ ឯក La Cima Cartel Chan SreyKhouch - ចាន់ ស្រីខួច