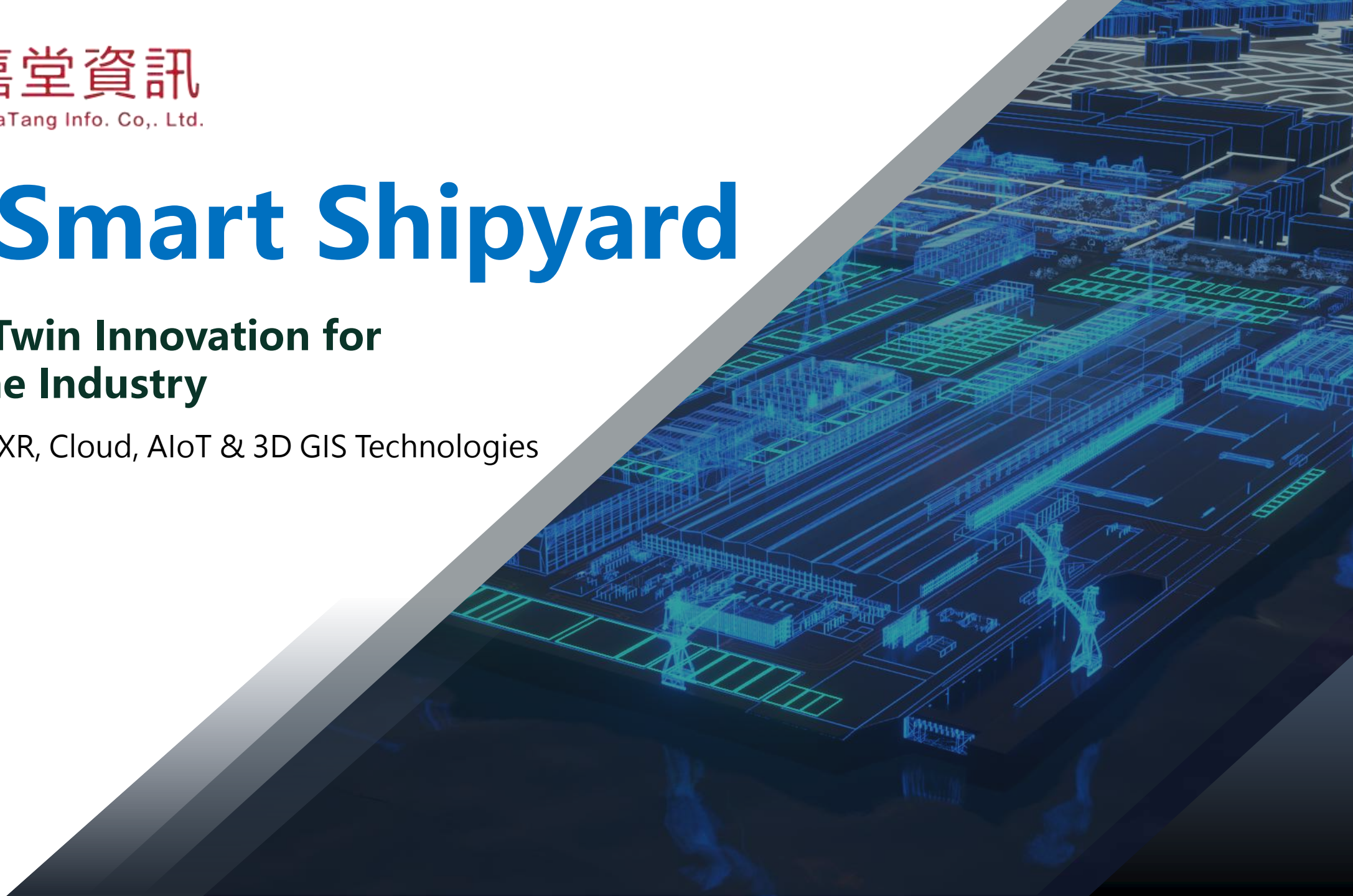
嘉堂資訊
ChiaTang Info. Co,. Ltd.

5G Smart Shipyard

Digital Twin Innovation for Maritime Industry

Integrated XR, Cloud, AIoT & 3D GIS Technologies



Company Introduction

Hsinchu
/ Headquarter
/ Since 2014

"Integrate XR 、IoT、AI and Digital Twin technology,
building a safer, wiser working environment ,
Implement industrial digital transformation."

Kaohsiung
/ Branch
/ Since 2020

嘉堂資訊

The Workforce of the Future _

(Metaverse x Digital Twin) = XR ∞ Collab Possibility

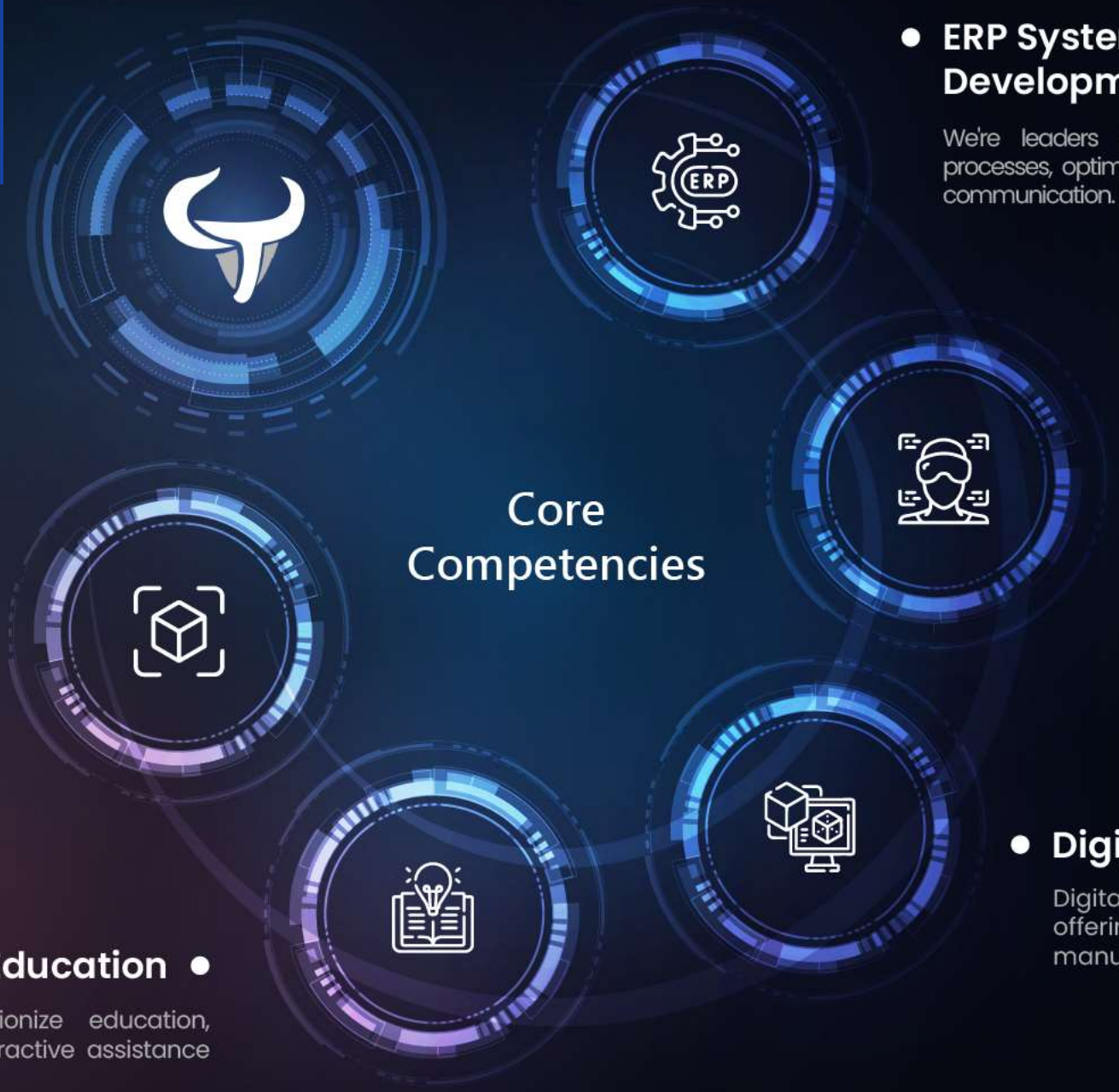
- Data Visualization
- Real-time Interaction

(Metaverse x Content) = XR ∞

Creativity Possibility

Reshaping the next-generation workforce

Core Competencies



ERP System Development

We're leaders in ERP solutions, streamlining processes, optimizing resources, and enhancing communication.

XR Simulation System for Industry Training

We lead in XR simulation for industry training, offering immersive, safe, skill-enhancing solutions.

Digital Twin for Shipyard

Digital twin tech optimizes shipyard ops, offering real-time insights for efficient manufacturing.

AI Avatar for Education

Our AI avatars revolutionize education, offering personalized, interactive assistance for dynamic learning.

AR Assistant for Industry Operation

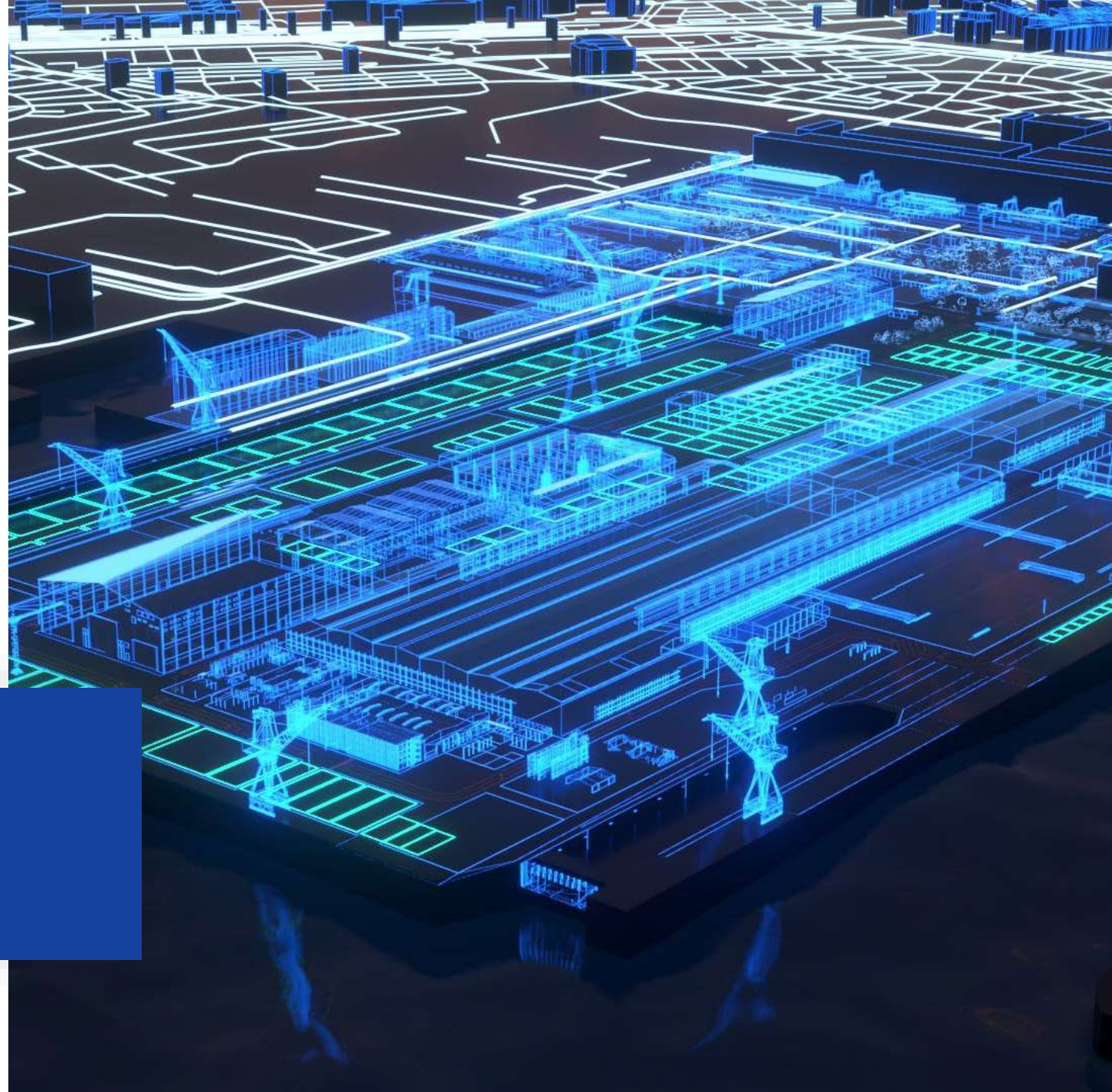
Our AR/MR assistants optimize industry operations, enhancing efficiency with on-the-job guidance.

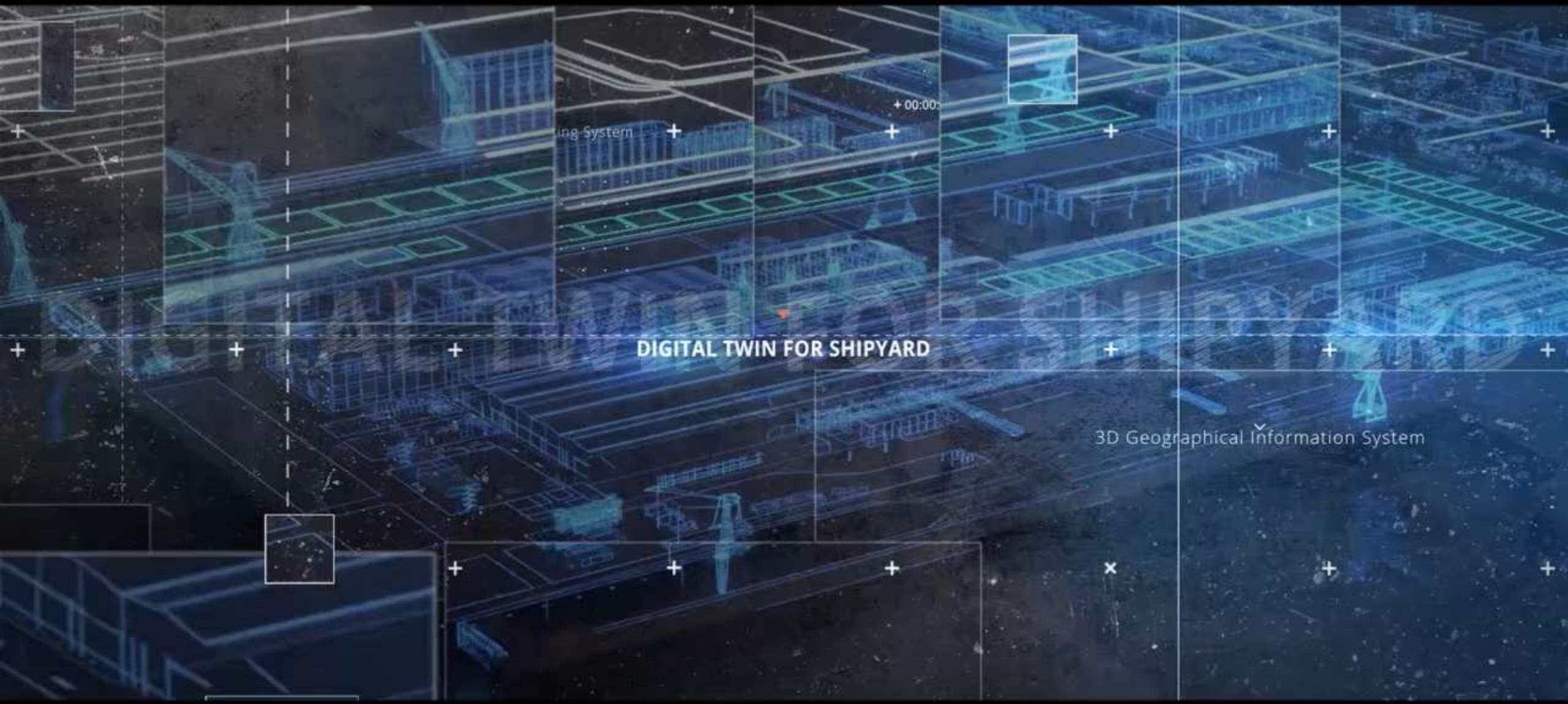
Project Overview

5G AIoT
Smart shipyard System

Marine Simulation

#Smart Shipyard
#Dashboard
#AIoT
#Ship Building
#Digital Twin




DIGITAL TWIN FOR SHIPYARD
3D Geographical Information System

Marine Simulation

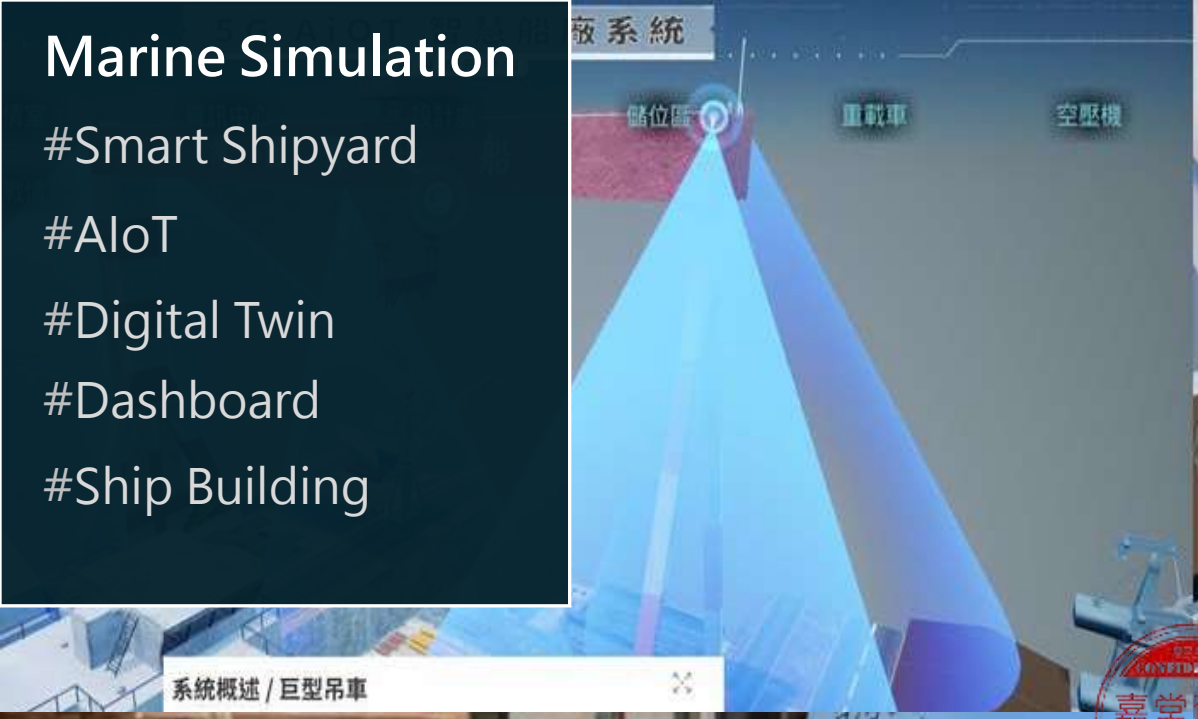
#Smart Shipyard

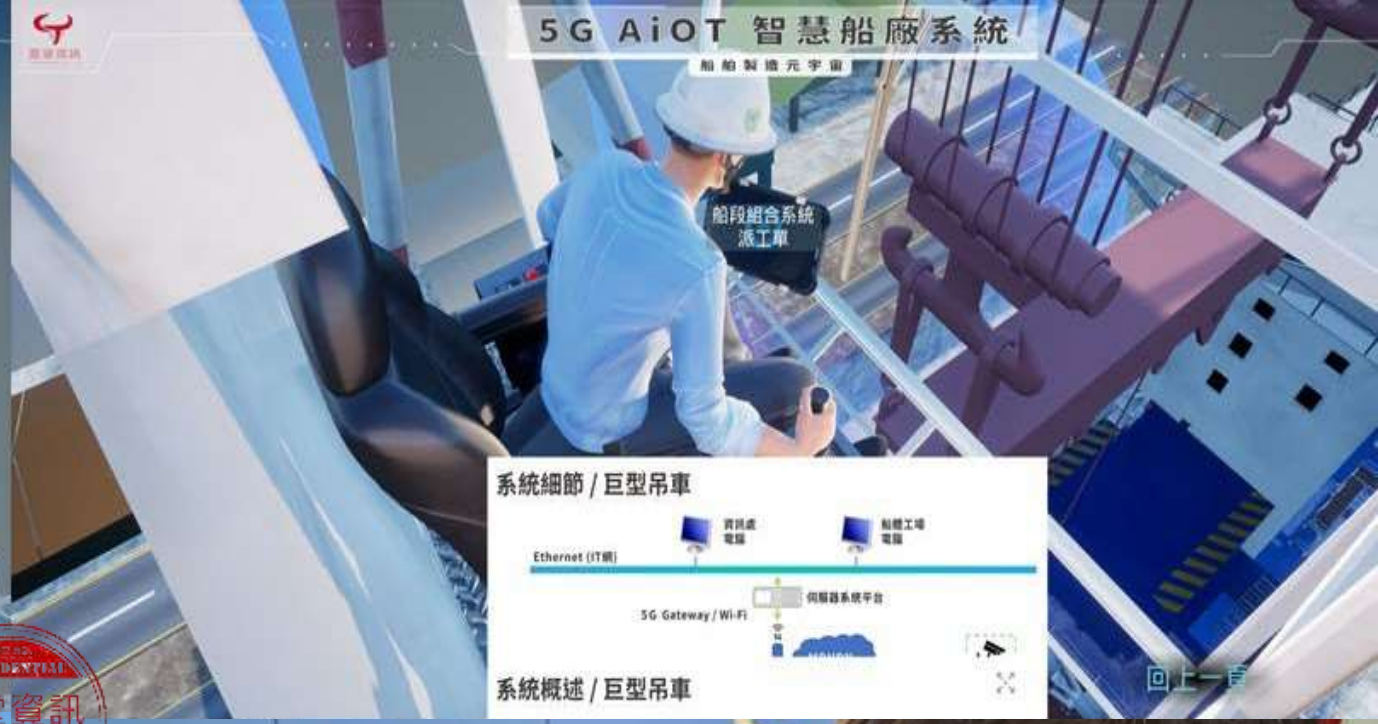
#AIoT

#Digital Twin

#Dashboard

#Ship Building





CONFIDENTIAL
嘉堂資訊
ChiaTang Info. Co., Ltd.
CONFIDENTIAL

Digital Twin Architecture

Physical Layer

Actual assets, 3D scanning, sensors, IoT devices

Virtual Layer

3D assets, Omniverse, Isaac Sim, real-time sync

Intelligence Layer

AI/ML models, predictive analytics, automation

GIS Interconnects & Integrates

Creating Relationships and Streamlining Workflows

Data Capture & Integration

Data Modeling
System Integration
Reality Capture
Information Management

Real Time & Visualize

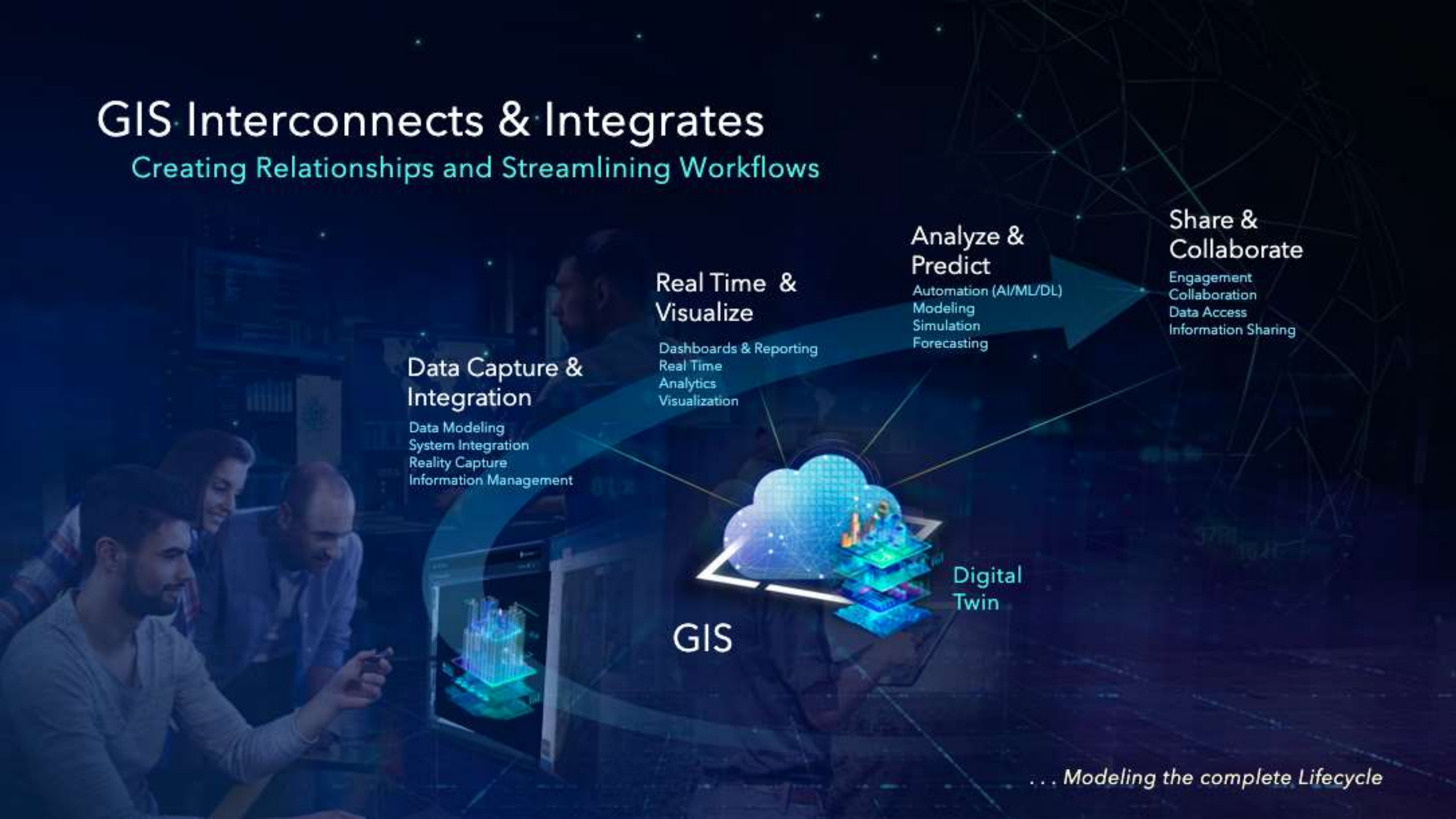
Dashboards & Reporting
Real Time
Analytics
Visualization

Analyze & Predict

Automation (AI/ML/DL)
Modeling
Simulation
Forecasting

Share & Collaborate

Engagement
Collaboration
Data Access
Information Sharing



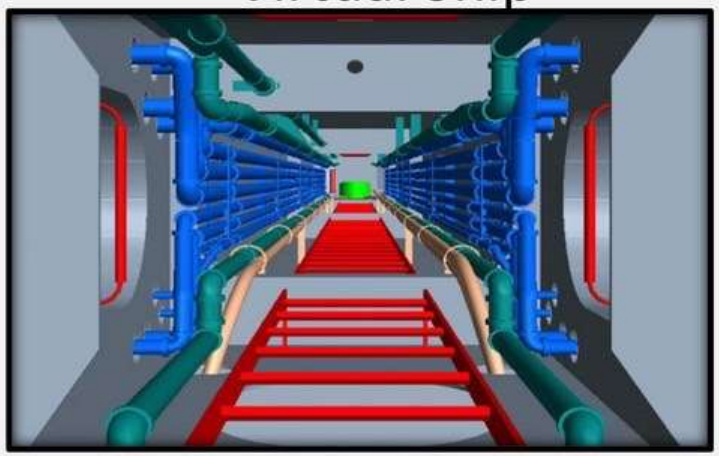
. . . Modeling the complete Lifecycle

Lifecycle Digital Twin: Physical – Virtual Alignment

(Create Data)

Design

Virtual Ship



3-D CAD

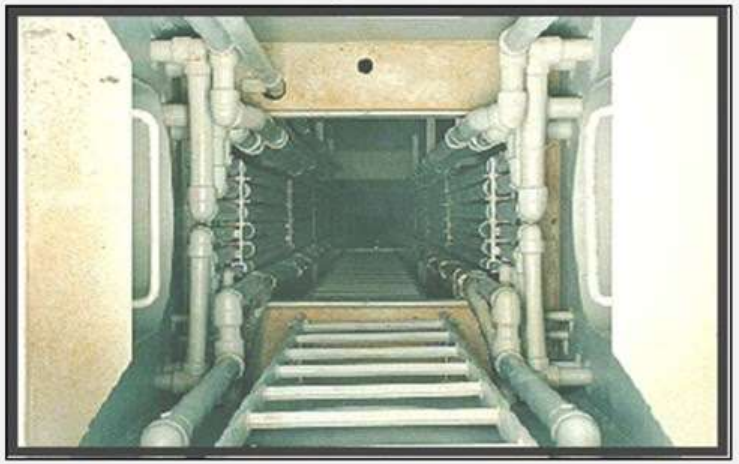
- Requirements
- Product Definition
- Customer Approval

Manufacturing & Assembly

(Consume Data)

Build

Physical



Ship Photo

- Build schedule & Sequence
- Material & Progress
- Inspection & Test

Delivery

This is what we are figuring out:

(Leverage/Maintain Data)

Sustain

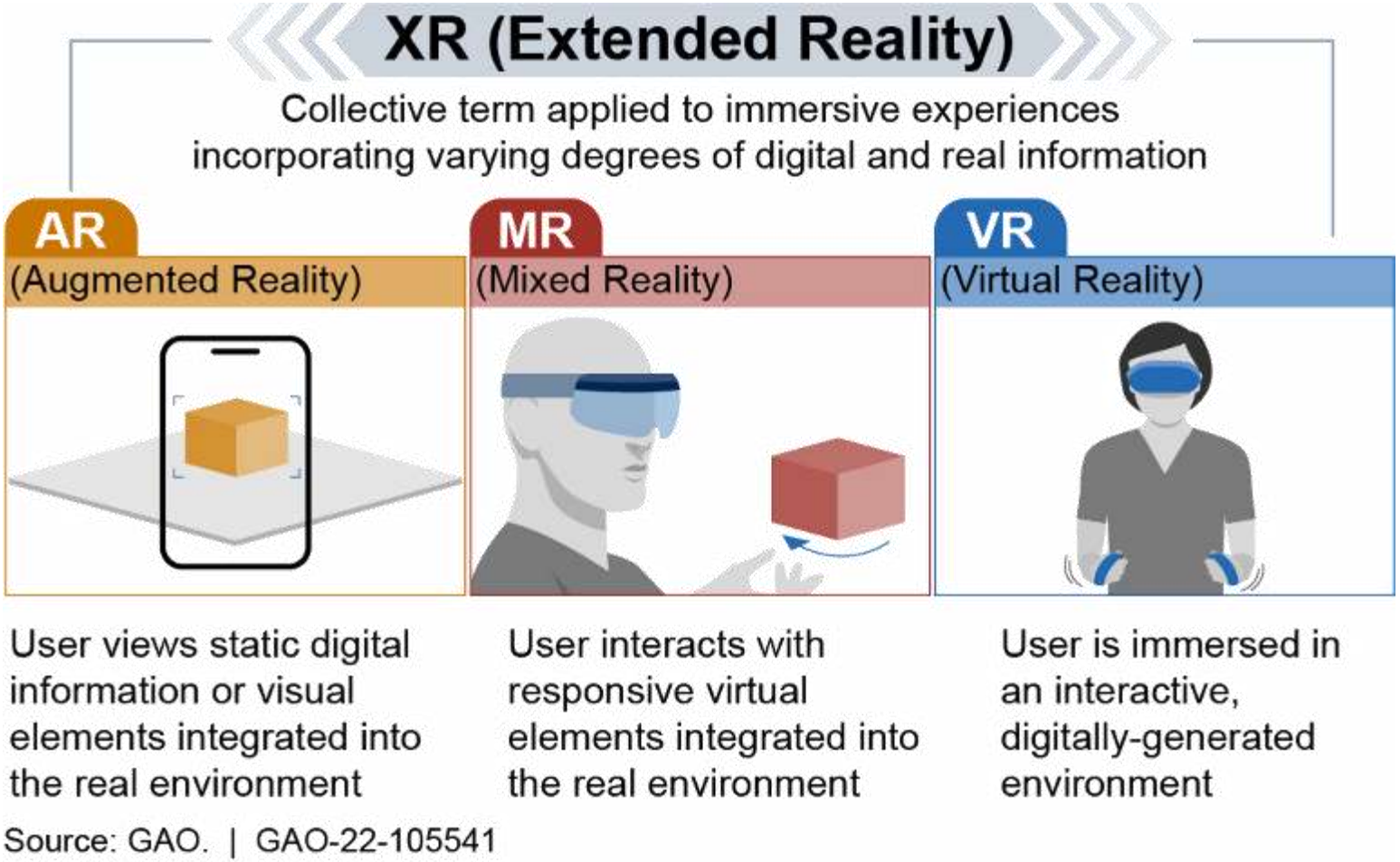
Intelligent Digital Twin

- Maintenance & Repair
- Modernization
- Operational State

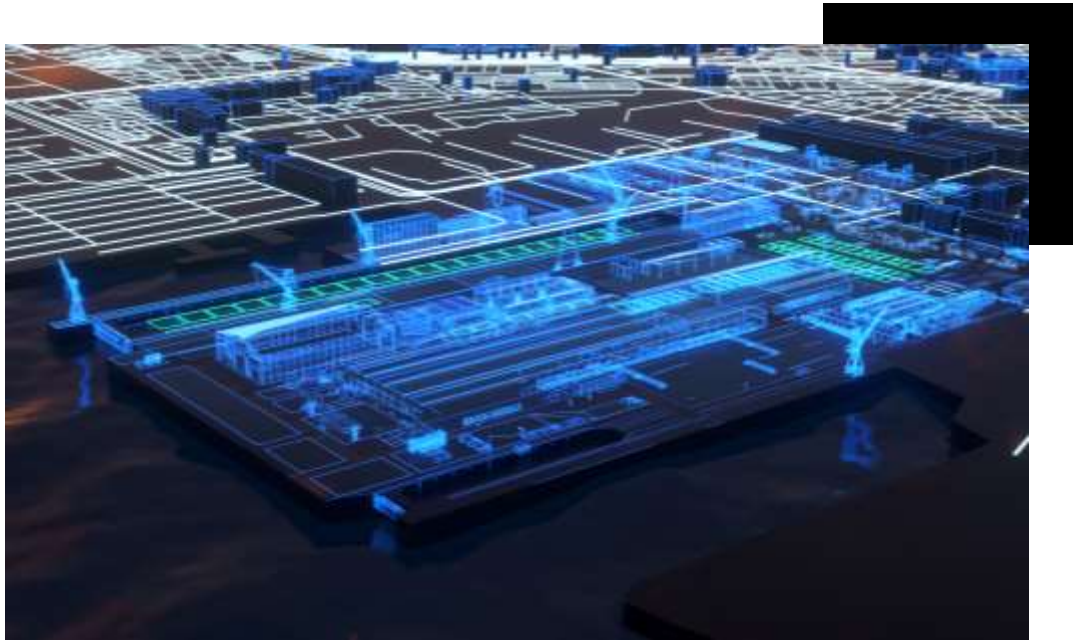
Lifecycle

"DISTRIBUTION STATEMENT A. Approved for public release."

XR-MR、VR、AR Definitions



Application of Storage Location Management in Smart Shipyards



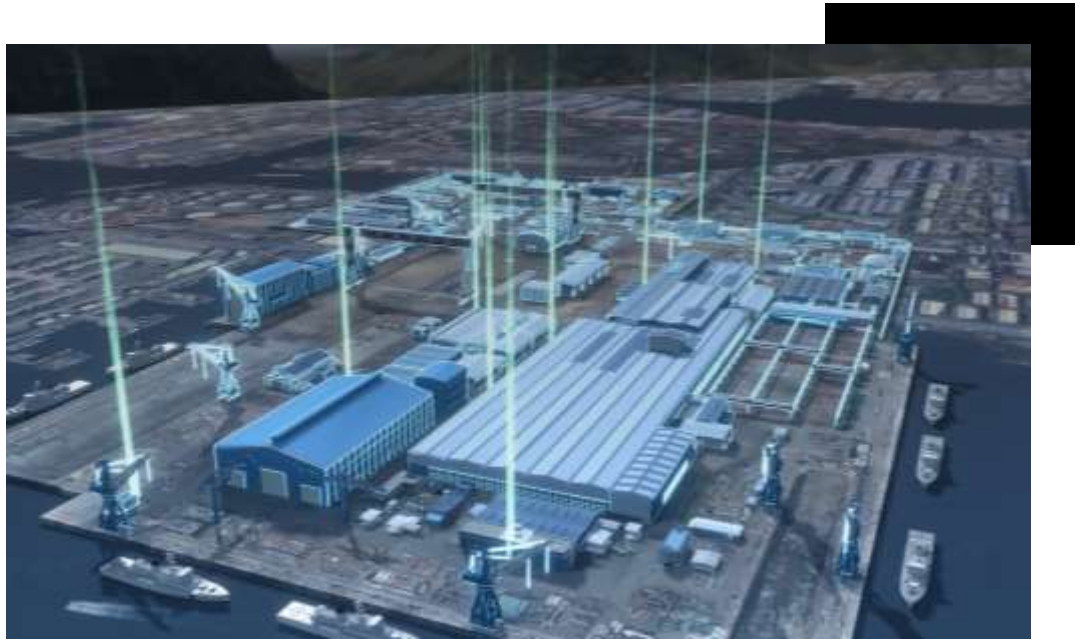
Core functions of an intelligent storage location management system:

- **3D visual storage management:** use 3D models so managers can directly see space usage and block locations.
- **Block–space matching:** the system automatically assigns the best storage slot based on block size and shape to avoid wasted space.
- **Smart dispatching:** it auto-plans lifting and handling schedules from block needs and storage status, then sends tasks to staff and equipment.
- **Real-time monitoring:** sensors and networks track storage use and block movements and feed this back to managers for quick decisions.

Application of Storage Location Management in Smart Shipyards

- Batch conversion of design models into interoperable formats
- Enable asset tracking and component management
- Support real-time warehouse location visualization

How to improve the efficiency and accuracy of shipbuilding



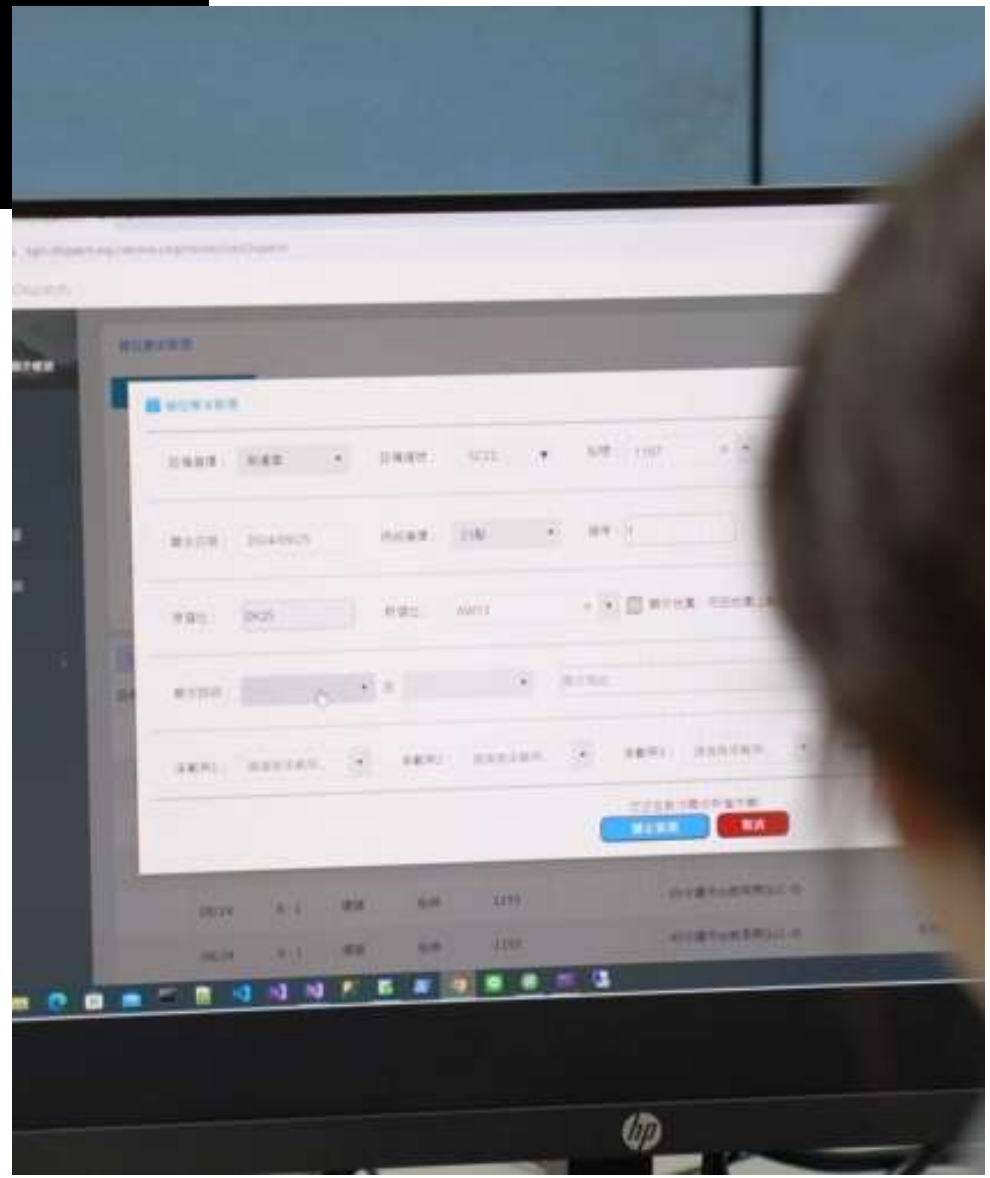
Empower AI applications to enable intelligent management.

5G AIoT technology gives AI applications a strong network foundation, making smart shipyards possible. High-resolution images can be sent over 5G to backend AI systems for analysis, enabling.

Smart inspection: automatically recognizing hull storage conditions, abnormalities, and storage-space usage to improve inspection speed and quality.

Smart dispatching: planning lifting and handling tasks based on block needs and storage status to optimize resource allocation.

Smart inspection enance: using AI to analyze equipment data, predict failures early, and schedule maintenance in advance to avoid production delays.



Benefits of applying an intelligent storage location management system

- **Improve space use:** smart slot allocation and management maximize storage space and cut waste.
- **Optimize material handling:** the system plans the best put-away and pick-up routes to shorten travel distance and time.
- **Boost productivity:** smart storage ensures timely and accurate material supply, reducing waiting and raising throughput.
- **Reduce safety risks:** the system monitors storage conditions to prevent overloading, collisions, and other accidents.

Real-time shipyard data and comprehensive monitoring

1. Integrate the data flows and subsystem architectures of all departments to establish an "Integrated **Smart Shipyard Operations Center**."
2. Use a 5G private network environment to connect each department's information flows and systems in real time into a **unified digital intelligent system**.
3. Present the collected smart-shipyard manufacturing information through a 3D dashboard, providing intuitive operation and enabling real-time monitoring of system status on graphical panels.

Marine Simulation

#Smart Shipyard

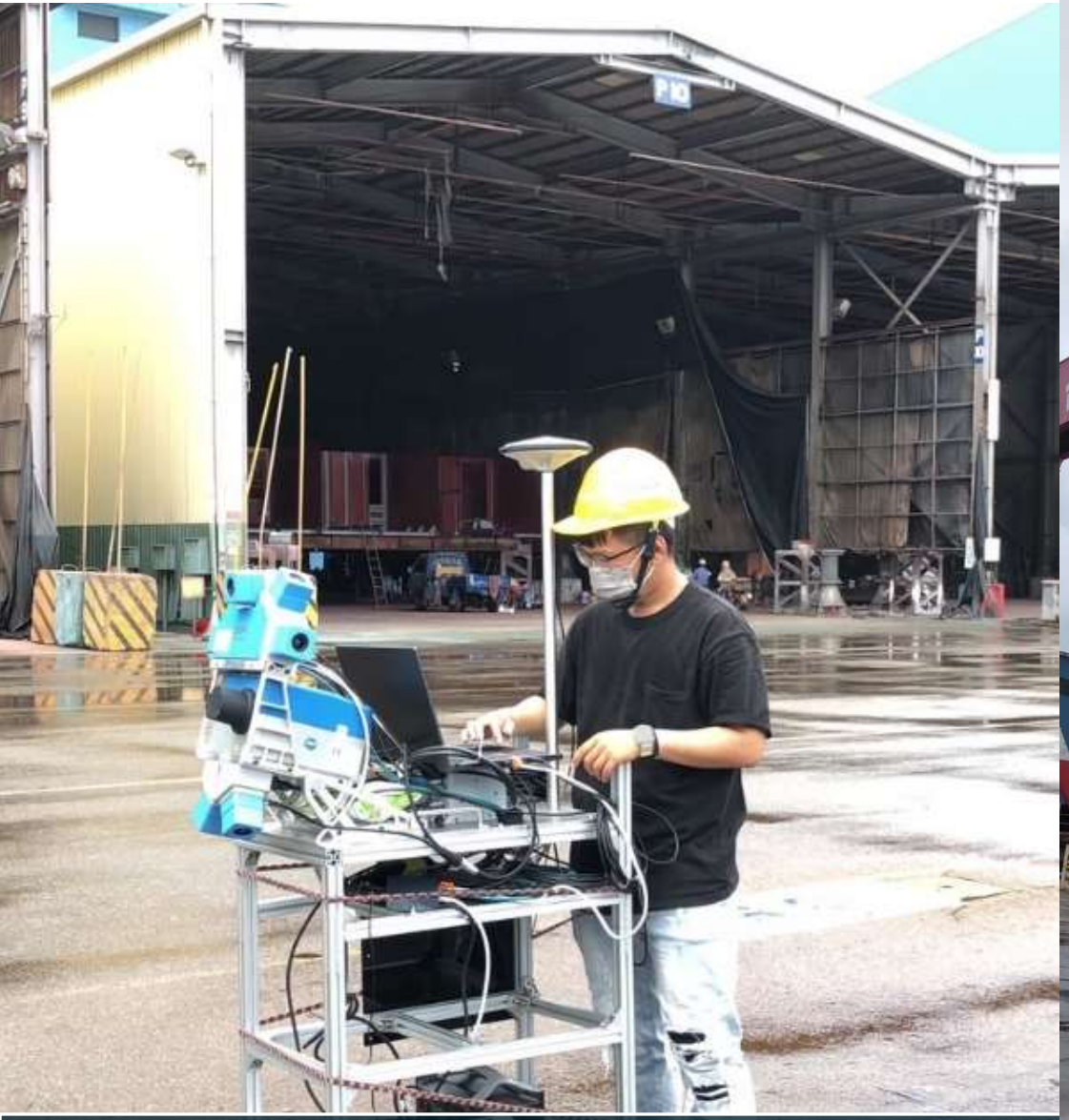
#AIoT

#Digital Twin

#Dashboard

#Ship Building

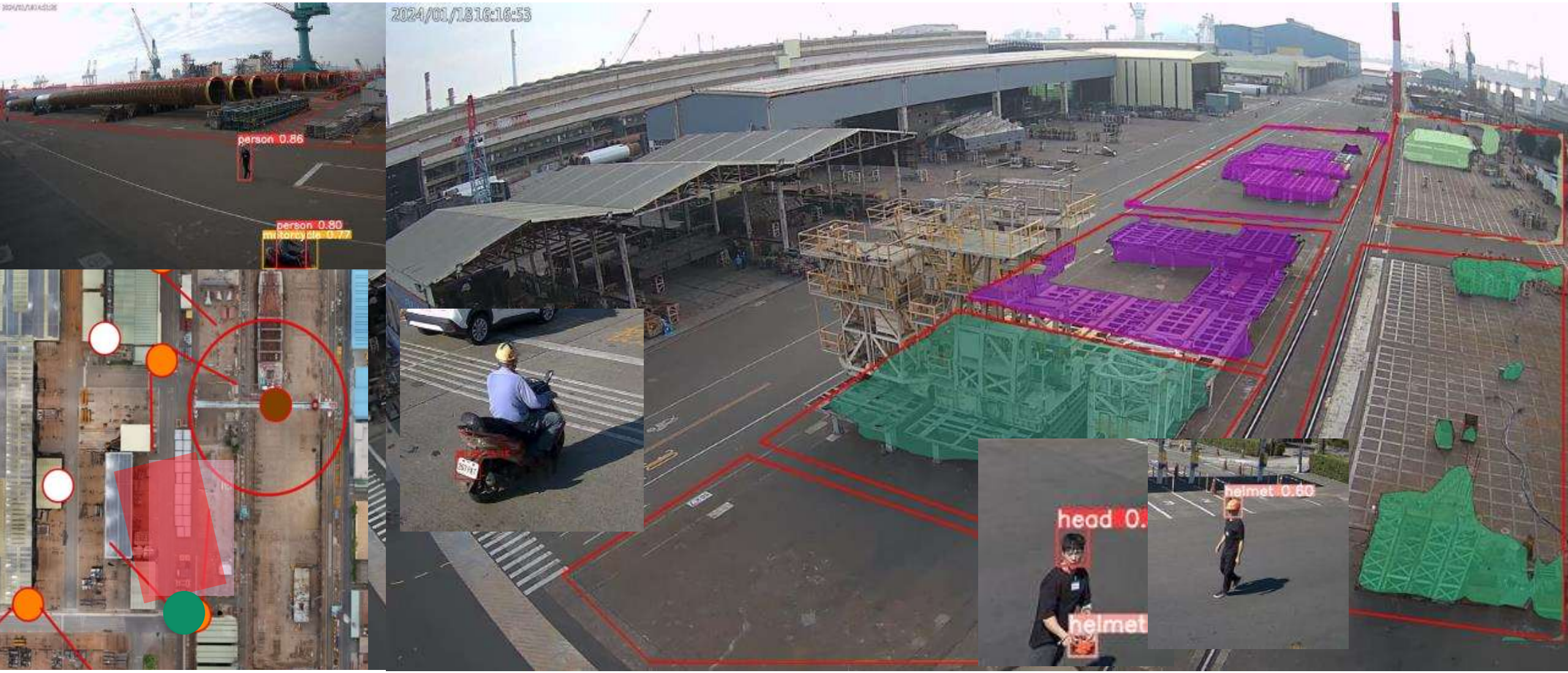
嘉全資訊
CONFIDENTIAL



Vehicle-mounted mobile mapping system

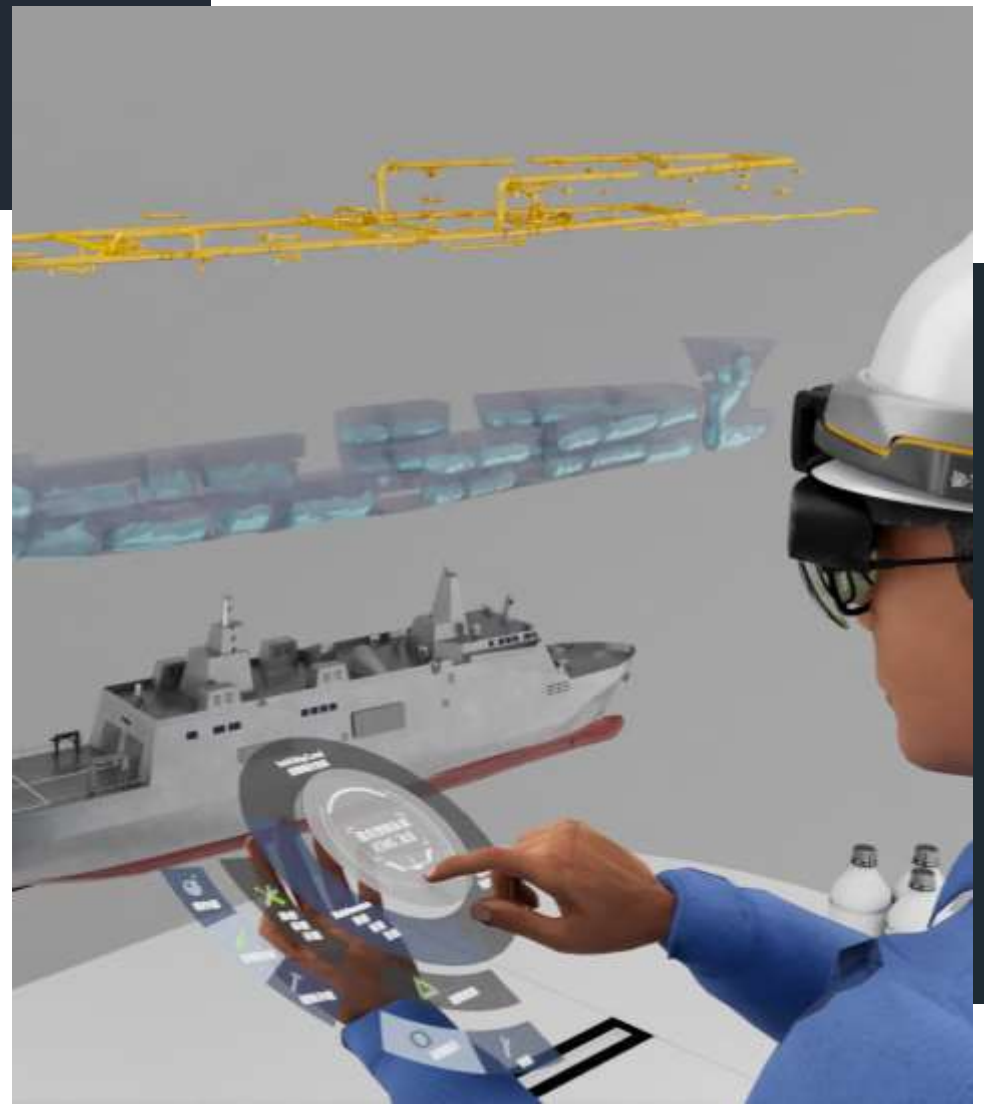
Shipyard 3D Geographic Information System(GIS)

【Design and Modeling of an Intelligent Inspection System】



3D Laser Spatial Scanning Application

Utilizes 3D space scanning for modeling and positioning



Applications of XR Technology

1. Data visualization method

Integrates virtual reality (VR), augmented reality (AR), and mixed reality (MR) technologies.

2. XR applications in shipyards

Improves the efficiency and accuracy of on-site operations, training, and maintenance.

Industrial Training

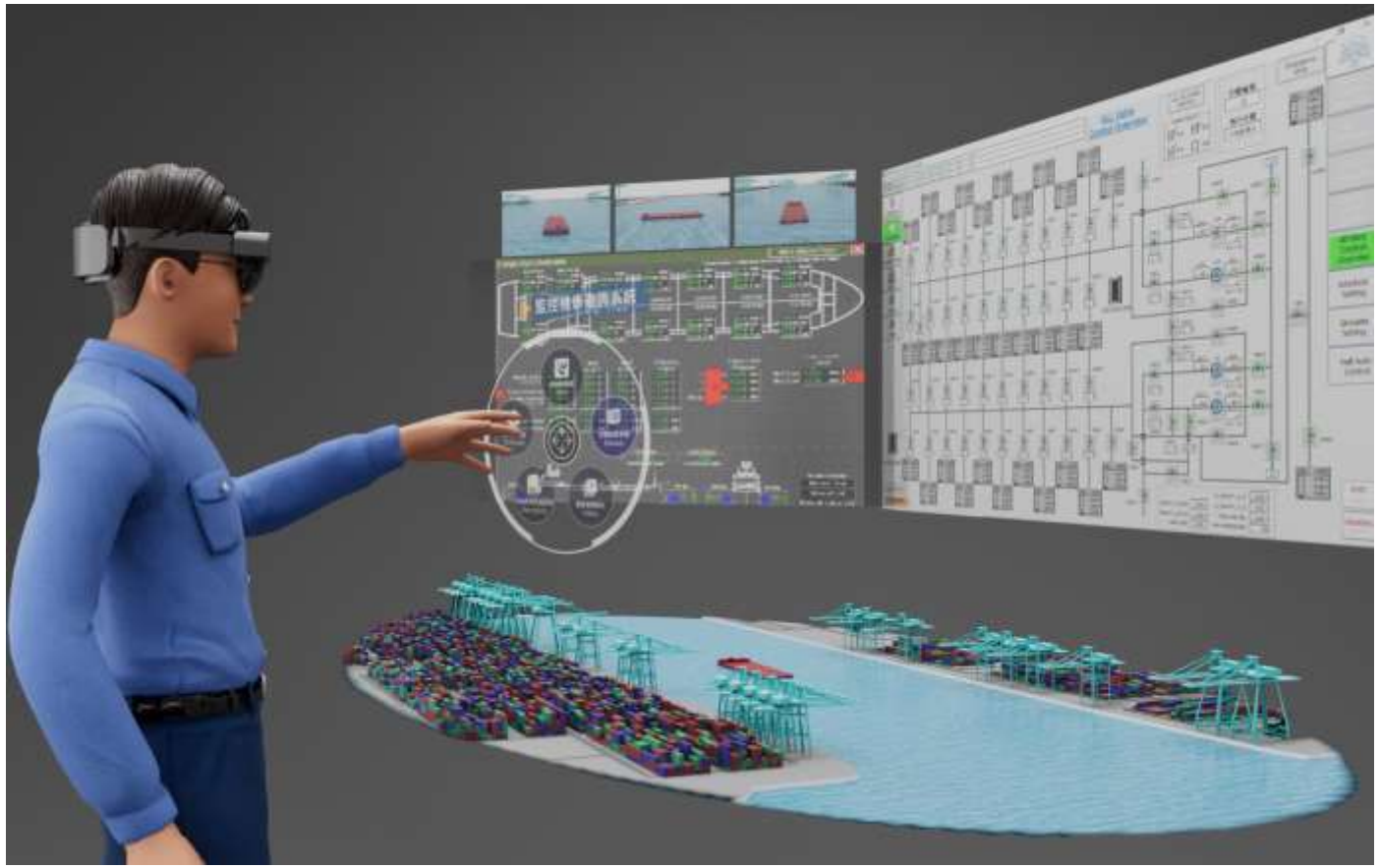
#XR Training

#Valve

#Knowledge Management

#Digital Twin

XR Technologies for Manufacturing



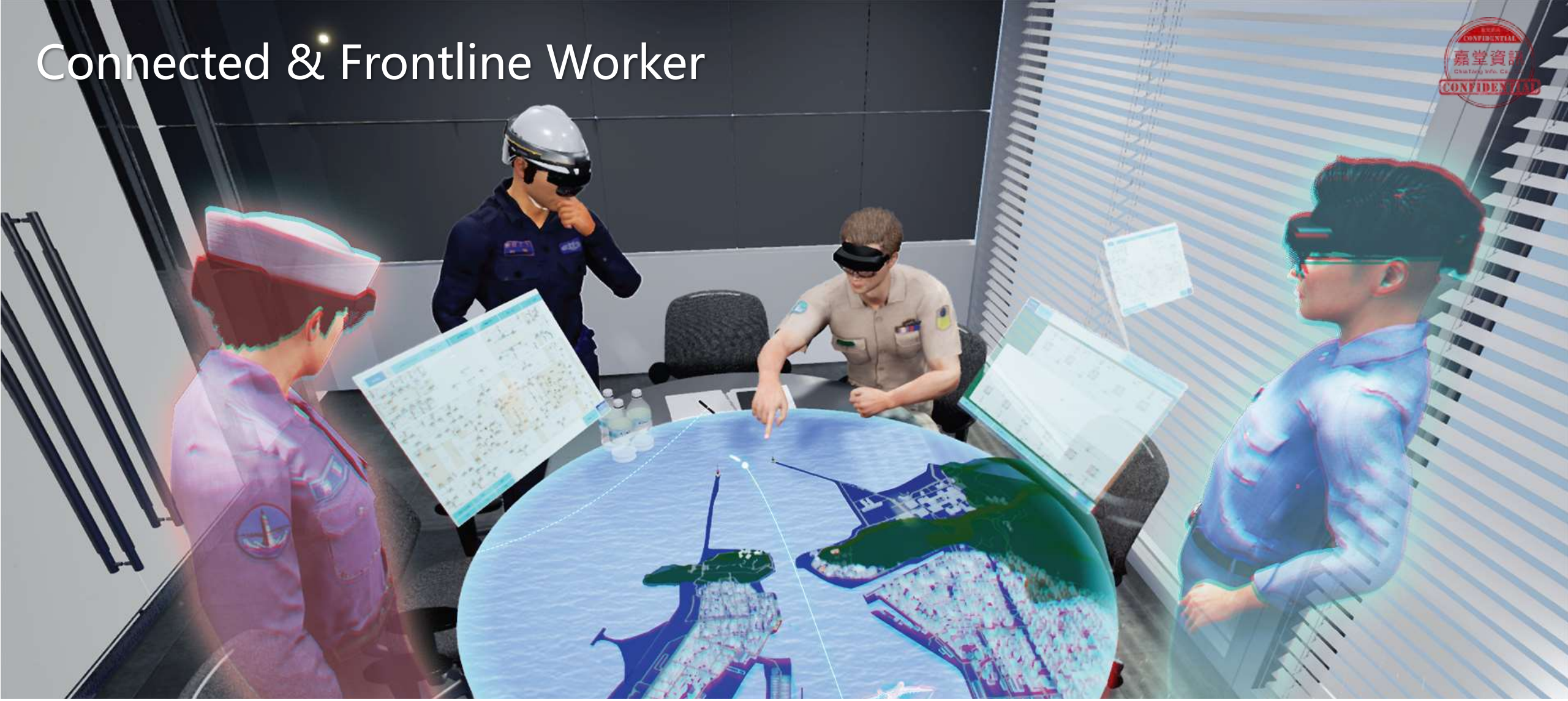
CONFIDENTIAL
嘉堂資訊
CONFIDENTIAL

Operational Visibility (Digital Boardroom) Improve visibility across connected factory assets and processes to increase productivity of equipment and labor across sites.

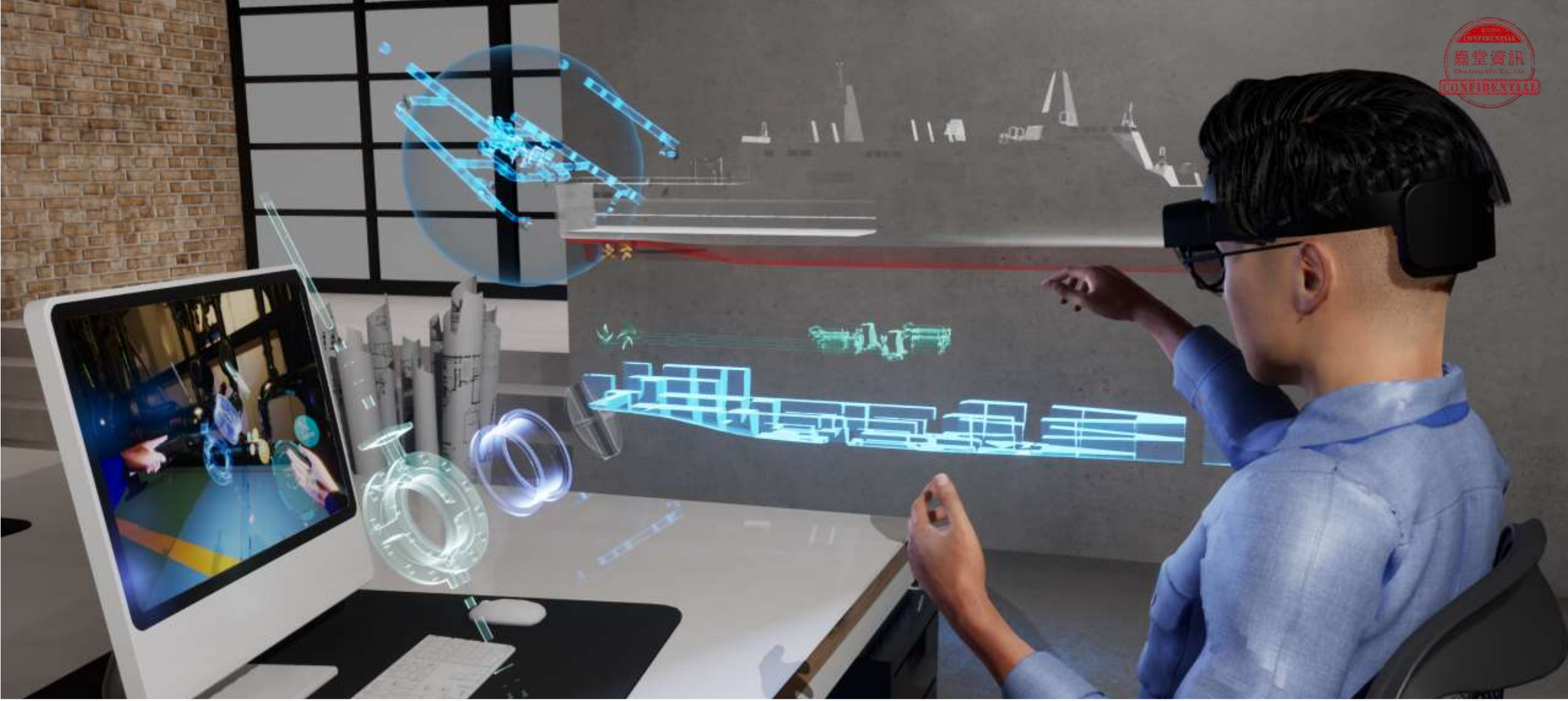
XR Technologies for Manufacturing

Operational Visibility (Digital Boardroom) Improve visibility across connected factory assets and processes to increase productivity of equipment and labor across sites.

Connected & Frontline Worker



Empower worker workforce with digital contents and XR devices that offer the best experiences for collaboration and productivity.

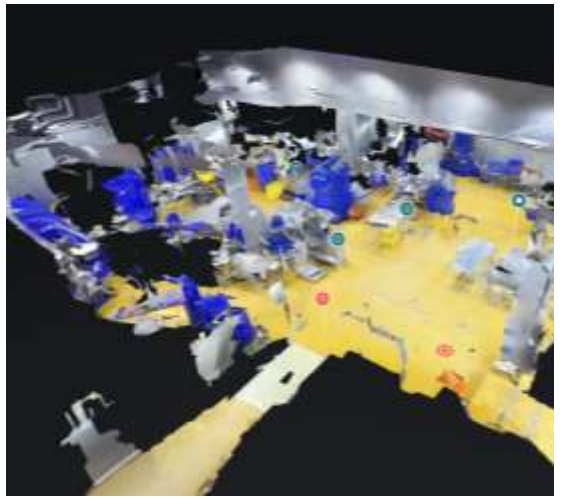


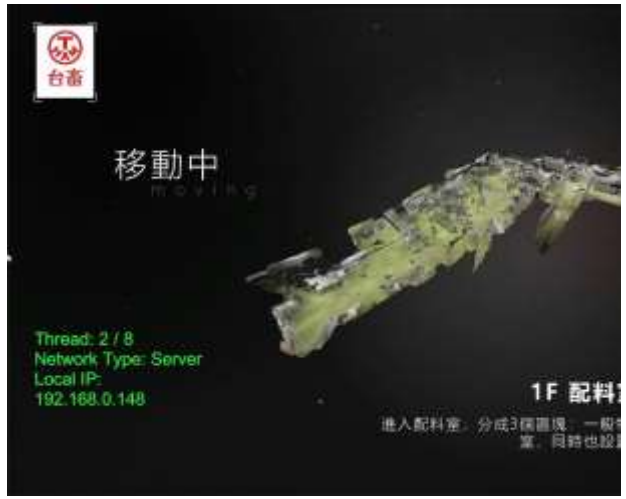
Empower worker workforce with digital contents and XR devices that offer the best experiences for collaboration and productivity.

Smart Food Safety Application

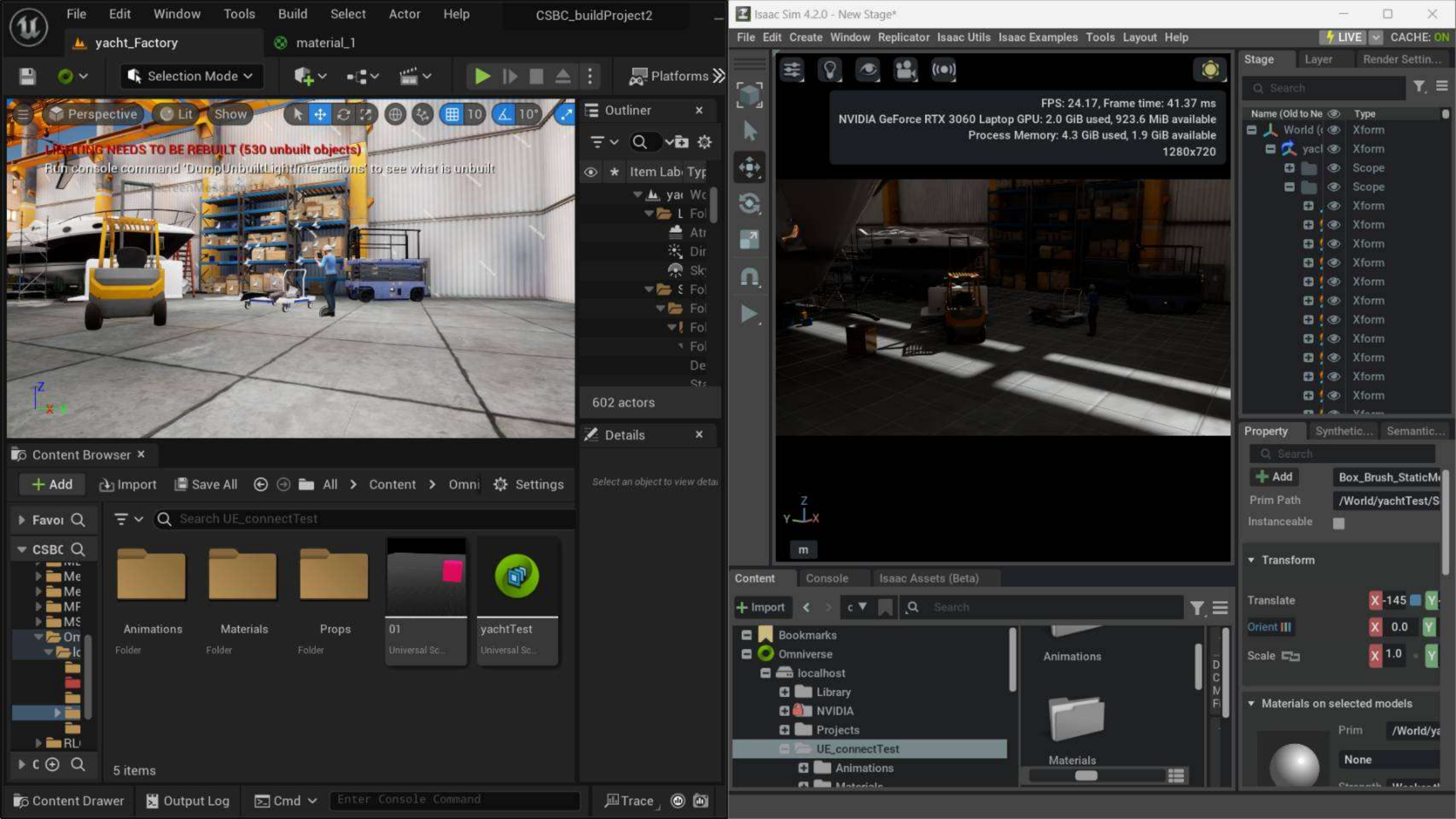
Using a 5G Private Network with AR and AI technologies in Meat Processing Production Lines

This project integrates them into the food processing industry to build a remote, cyber-physical AR factory tour experience. It enables a zero-risk, highly flexible immersive tour and is also applied to food-plant safety inspections to realize paperless, AI-driven smart inspections.





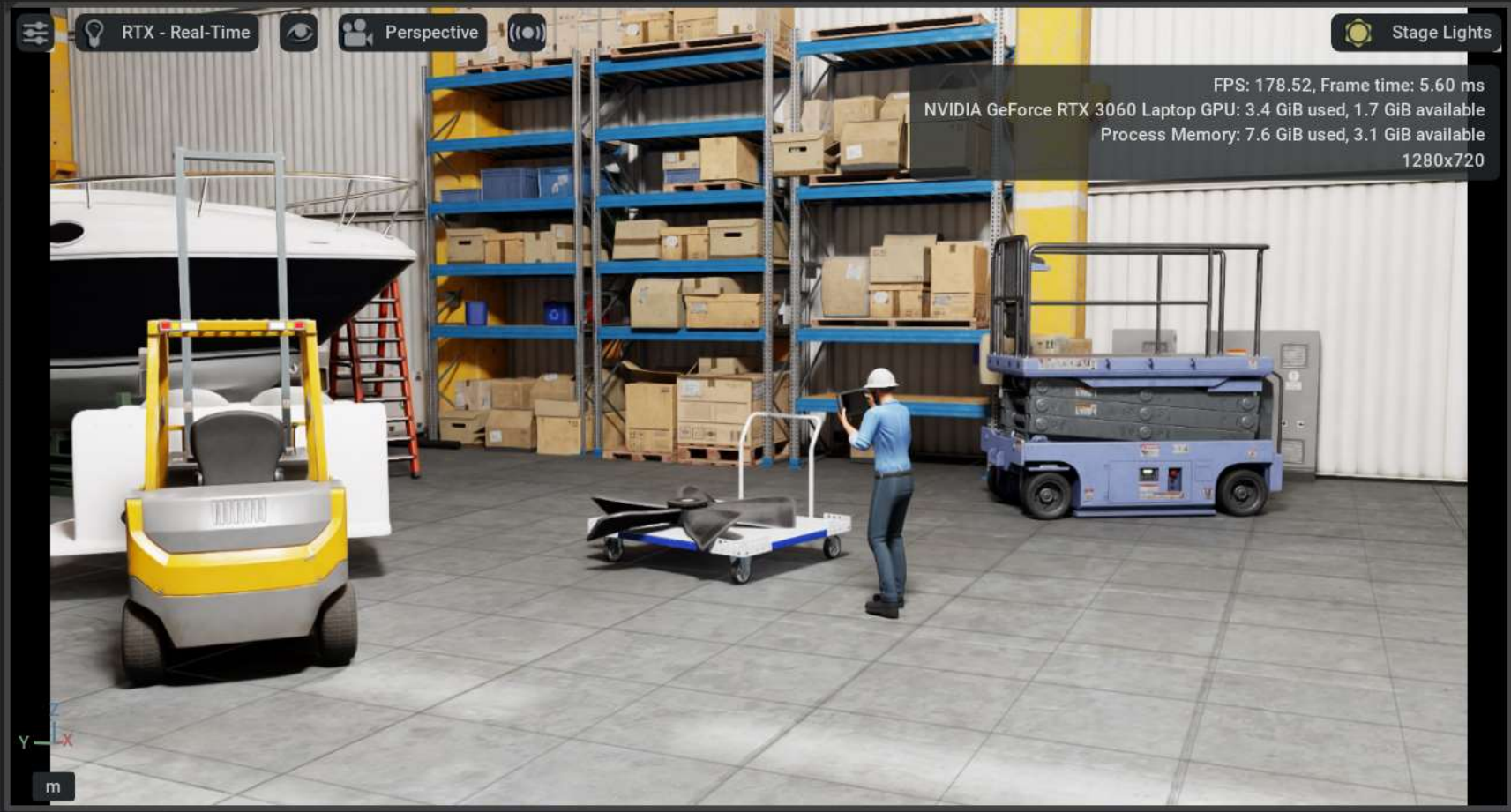
嘉堂資訊
CONFIDENTIAL


File Edit Window Tools Build Select Actor Help
CSBC_buildProject2
yacht_Factory
material_1
Selection Mode
Platforms
Perspective Lit Show
LIGHTING NEEDS TO BE REBUILT (530 unbuilt objects)
Run console command 'DumpUnbuiltLightInteractions' to see what is unbuilt
Outliner
602 actors
Details
Select an object to view details
Content Browser
Add Import Save All All Content Omni Settings
Search UE_connectTest
Animations Folder
Materials Folder
Props Folder
01 Universal Sc...
yachtTest Universal Sc...
5 items
Content Drawer
Output Log
Cmd
Enter Console Command
Trace
Isaac Sim 4.2.0 - New Stage*
File Edit Create Window Replicator Isaac Utils Isaac Examples Tools Layout Help
LIVE
CACHE: ON
FPS: 24.17, Frame time: 41.37 ms
NVIDIA GeForce RTX 3060 Laptop GPU: 2.0 GiB used, 923.6 MiB available
Process Memory: 4.3 GiB used, 1.9 GiB available
1280x720
m
Stage
Layer
Render Settin...
Search
Name (Old to Ne
Type
Xform
Scope
Property
Synthetic...
Semantic...
Add
Box_Brush_StaticM
Prim Path
/World/yachtTest/S
Instanceable
Transform
Translate
Orient
Scale
Materials on selected models
Prim
None
Content
Console
Isaac Assets (Beta)
Import
Bookmarks
Omniverse
localhost
Library
NVIDIA
Projects
UE_connectTest
Animations
Materials

Isaac Sim 4.2.0 - file:/D:/Omniverse/OmniProject/yachtUE_test.usd*

File Edit Create Window Replicator Isaac Utils Isaac Examples Tools Layout Help

LIVE CACHE: ON



Stage Layer Render Settings

Search

Name (Old to New)	Type
SM_MetalWallPart_100	Xform
SM_MetalWallPart_101	Xform
SM_MetalWallPart_102	Xform
SM_MetalWallPart_103	Xform
SM_MetalWallPart_104	Xform
SM_MetalWallPart_105	Xform
SM_MetalWallPart_106	Xform
SM_MetalWallPart_107	Xform
SM_MetalWallPart_108	Xform
SM_MetalWallPart_112	Xform
SM_MetalWallPart_113	Xform
SM_MetalWallPart_114	Xform
SM_MetalWallPart_115	Xform
SM_MetalWallPart_116	Xform
SM_MetalWallPart_120	Xform

Property Synthetic Data Recorder Semantics Schema Editor

Search

Add SM_MetalWallPart_101

Prim Path /World/yachtTest/Scene/SM_MetalWallPart_101

Instanceable

Transform

	X	Y	Z
Translate	-2350.00977	-2200.0	800.00031
Orient	90.0	0.0	0.0
Scale	1.0	1.0	1.0

Materials on selected models

Prim /World/yachtTest/Scene/SM_MetalWallPart_101

None

Strength Weaker than Descendants

Content Console Isaac Assets (Beta)

Import D:/Omniverse/OmniProject/

Search

- Cache
- Content
- Data
- library
- OmniProject
- OneDrive
- OneDriveTemp
- Programs

yachtUE_test.usd

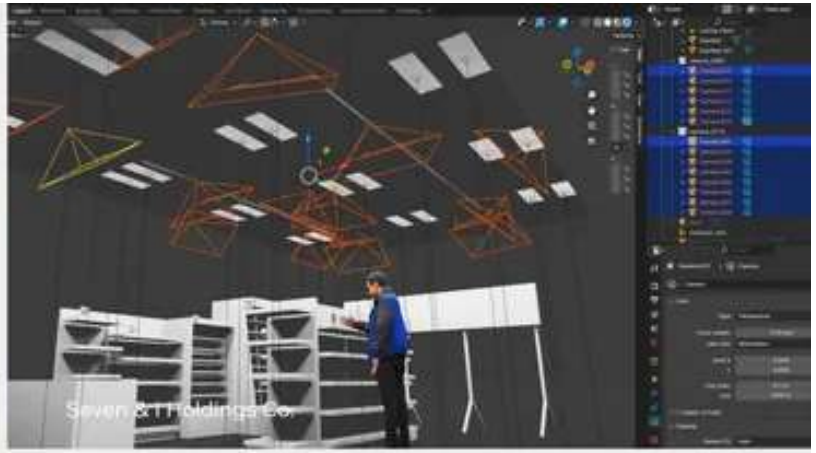
OmniProject

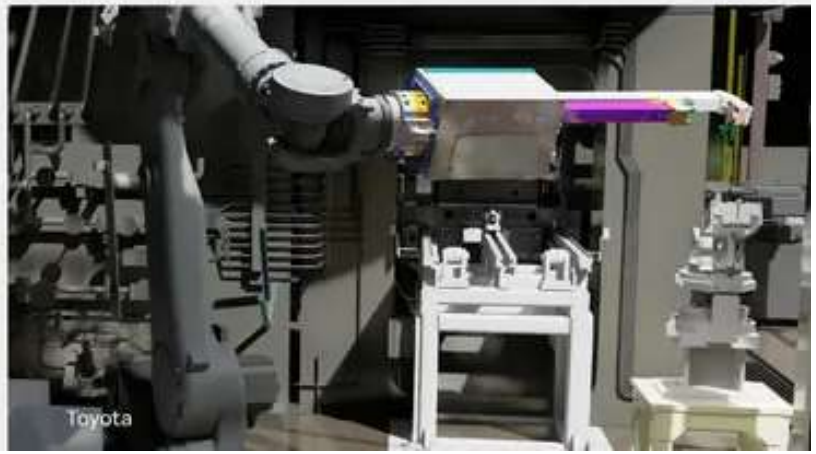
Date Modified 11/14/20... 09:41AM
Created by
Modified by
File size 0.00 KB

Checkpoints

Japanese companies leverage NVIDIA technologies to enable digital twin applications and drive future industrial innovation.

2024/11/14 03:37 Apple Daily Taiwan – A comprehensive report by Lu Cheng-che.





As Japan **faces population decline** and labor shortages, companies are turning to advanced **digital twin and AI technologies to** boost productivity and address workforce gaps. Major players such as **Toyota Motor, Yaskawa Electric, Seven & i Holdings, and Rikei Corporation** are already making strong progress, using **simulation and automation** to pave the way for future industrial development.

Toyota is using the **NVIDIA Omniverse platform** to physically simulate robot motions and enhance its metal forging production capacity.

THANK YOU

嘉堂資訊

ChiaTang Info. Co,. Ltd.

ChiaTang Info. Co, Ltd.