



Smart Construction System

THE ROAD
TO A
BETTER
FUTURE

CHAIN

Chain Technology – Company Introduction

- 1st local Digital Twin technology startup, successfully adopted iconic Digital Twin projects to different Government entities (CEDD, DSD, EMSD, EPD, HYD, WSD, HKIA, MTR, WKCD, etc)
- World-class technology in the rapidly growing "ConTech" & "PropTech" sector that has been evaluated and endorsed by industry experts
- Headquarter based in HK, with branch offices in Mainland China & Singapore
- Outstanding development team of around 70 local professionals in HK with intensive Digital Twin solution implementation experience with the expertise in Engineering, Construction, Surveying, A.I. & R&D.
- Strong market penetration with blue chip client base of property developers, owners, construction, civil engineering and consultation firms



Awarding Team & Solutions

2018

Hong Kong ICT Awards 2018
ICT Start Up – Bronze

2018

HK Awards For Industries 2018
Technological Achievement
Certificate of Merit

2018

Bentley's Year In Infrastructure 2018
Reality Modelling – Finalist
(Global)

2019

Hong Kong's Most Outstanding Business Awards 2019
Most Innovative Smart City
Solutions of the Year

2019

Hong Kong ICT Awards 2019
ICT Smart Business
Merit (Joint with HKAA)

2022

Hong Kong Construction Industry Council
Construction Innovation Award (Construction Safety) – 1st Prize

2021

Deloitte
Technology Fast 50 (China)

2021

Deloitte
Technology Fast 10 - No.2

2021

Communications Association of Hong Kong
STAR Award
Best 5G Application – Gold

2019

HSBC X HK Economic Times
Innovative Business Award
Innovative Startup – Silver



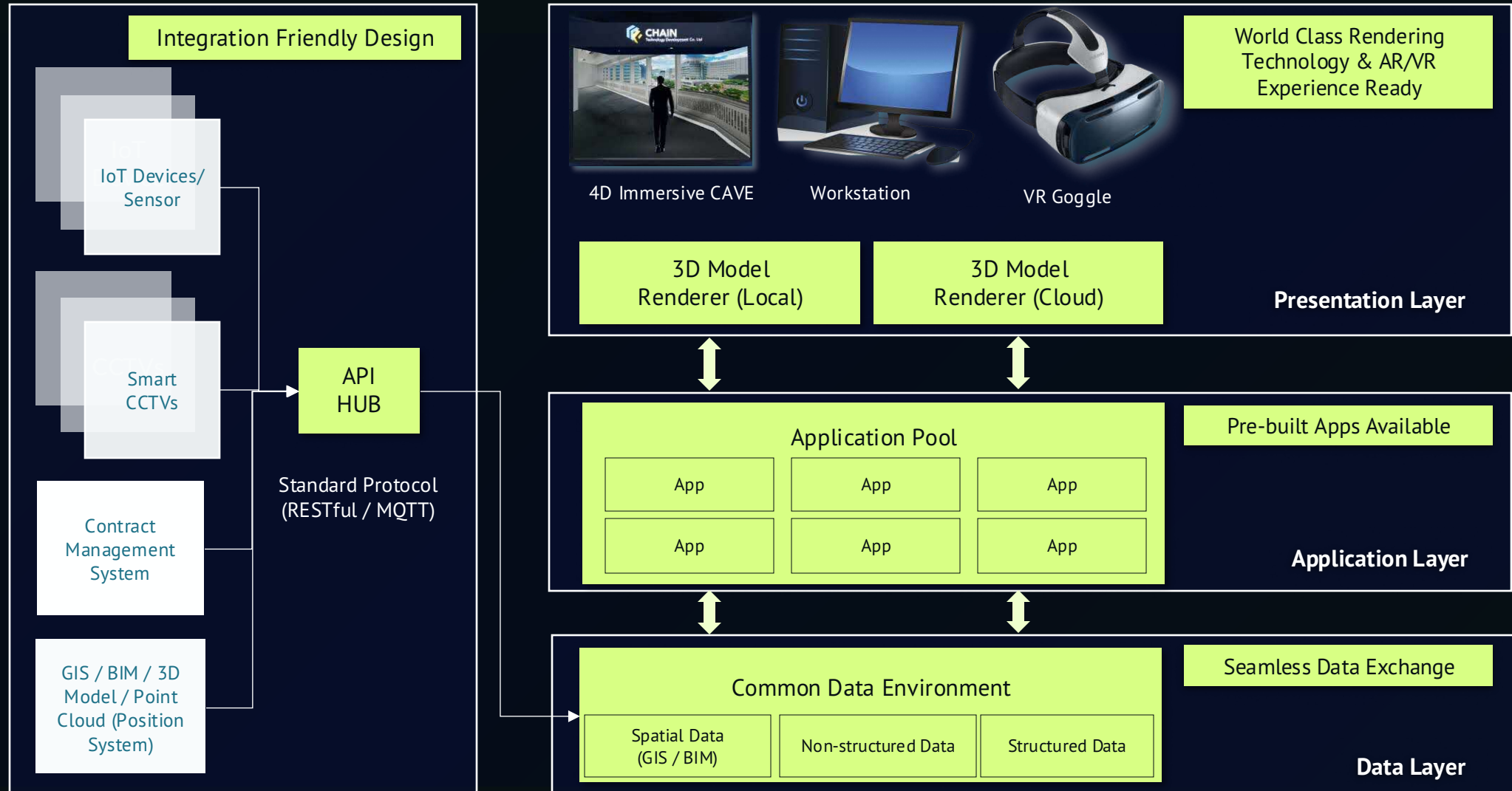
Off the Shelf Core System & Customized Modules

**Initial Set Up within 3 Weeks +
IoT Modules Integrated Every Week**

Module-Wised Application

- 4D Progress Management
- Worker's Safety Management
- Environmental Monitoring
- Settlement Data Management
- Tunnel Data Management
- Asset Tracking & Management
- Project Insights and Dashboard
- Alert Chatbot & Instant Messaging
- Digital Works Supervision System**
- Workflow Management
- IoT Data Hub

True CDE – Common Data Environment for Construction Projects



Key Advantages of Application of the **Smart Construction System**

8 Key Objectives & Benefits

1. **Centralize** the siloed data sources and overflowing information;
2. Visualize the numerical data in a **human-centric way**;
3. Establish complete workflows that connect various data source to **create synergy** ranges from predicting safety issues, verifying the actual site situation and directing proactive actions to frontline immediately;
4. **Establish safety performance benchmark** by comparison of individual sub-systems and contractors; and
5. **Establish standard** for data integration, formatting, transmission, alert handling and analytical dashboard for wider adoption in the construction industry.
6. **Enhance construction safety** of the workers and environment
7. **Facilitate construction progress** management
8. **Uplift built quality**



Project Overview

Search...

Sort By Type/Status

	Type	Status
KOWLOON		
Central Kowloon Route	Pavement & Bridge	70%
Kowloon City No.1 Sewage ...	Drainage	20%
West Kowloon Cultural ...	Land & Building	50%
HONG KONG ISLAND		
Wah Fu PTW	Drainage	40%
Redevelopment of Queen ...	Land & Building	10%
NEW TERRITORIES		
Hong Kong International ...	Transport	70%
Sai Sha Road Widening	Pavement & Bridge	100%
Tseung Kwan O Road D9	Pavement & Bridge	60%
Foot Bridges, Elevated ...	Pavement & Bridge	30%
Sha Tin STW	Drainage	30%
Pui O Water Pumping ...	Water	40%
H2OPE Centre	Water	70%
Siu Ho Wan Water ...	Water	40%
OTHER		
Water Group	Environment	40%
Total Number of Projects		50+

1 2 3 4 5 ... 22



Legend

- Transport
- Highways
- Civil
- Water
- Environment
- Drainage

100+ iconic construction projects

Marine Water Quality Monitoring



Holistic Management across the Whole Construction Phases



Smart
Planning &
Design



Smart
Construction

**One-Stop
Digital Twin
Solution**



Smart
Living

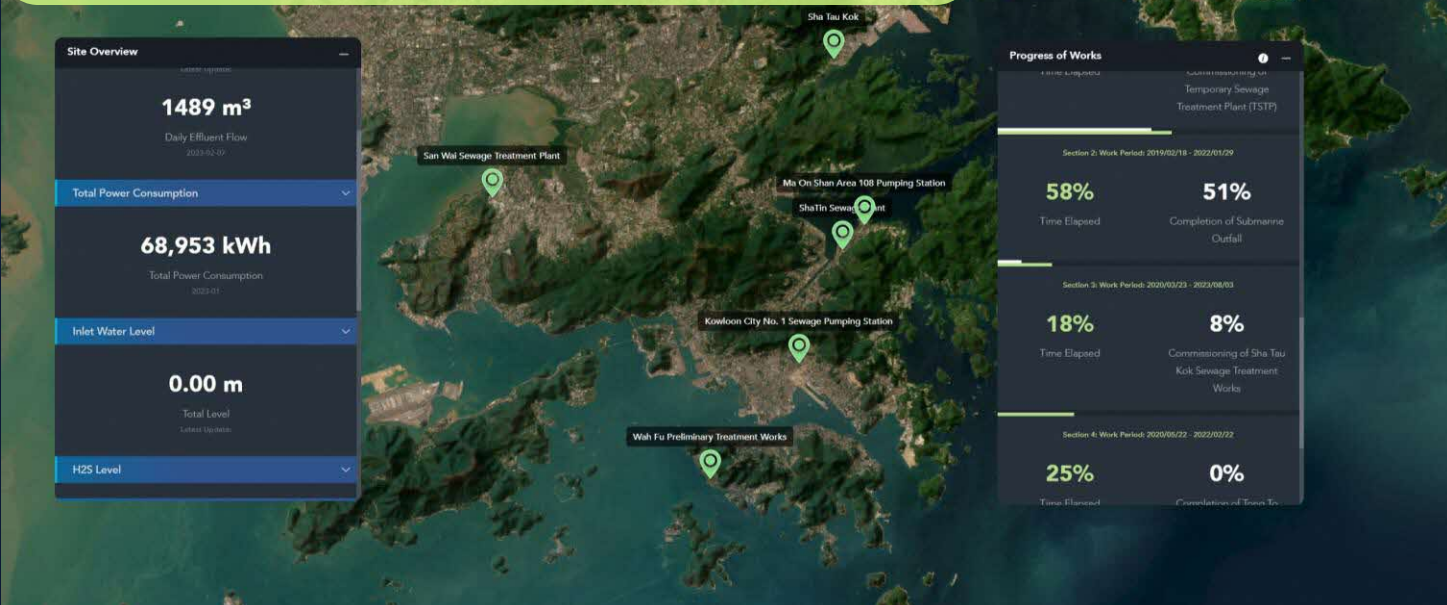


Smart
Facility
Management



Construction Management

Roads, Highways, Railways
Treatment Plant, Underground Utilities, Pumping Stations



Operation & Facility Management

Treatment Plant, Underground Utilities, Pumping Stations

Smart Site Safety, Progress Management, DWSS Integration, Commercial System Integration, SCADAR Integration for Operation

DFMA – Progress Management

Operation & Facility Management

Airports

The screenshot displays a comprehensive software interface for airport management. At the top, a navigation bar includes options like 'Model', 'IoT Dashboard', 'Data', 'Graph', 'Label', 'User Management', 'Settings', and a user profile 'Ertugrul C'. Below this is a toolbar with icons for various tools: Ruler, Area Ruler, Volume, Auto Path, Skin, Point, GeoTextile, Seawall, Inclinometer, Settlement, Surcharge, DCM, Panorama, Sunlight, Layout, Timeline, Show Layers, Show Info, and Upload.

The main view shows a 3D architectural model of an airport terminal. On the left, a sidebar provides detailed information for 'Terminal 1, L5', including sections for 'General', 'Flight Information', 'Baggage Inspection' (with status indicators for Working, Crowded, and Closed), 'Baggage Carousel', and 'Air Monitoring' (displaying 25°C indoor and 32°C outdoor temperatures, 53% humidity, and 239 kW energy usage). A 'Saved Walk Path' panel on the right lists paths like 'Skybridge', 'Other Showcase', and 'Terminal 1/2'. A date indicator at the bottom shows '20 Dec 2018'.





新機場中央控制中心6月啟用 巨型顯示展監察機場內外

機管局今日首次向傳媒披露今年6月啟用的「機場大腦」、第二代機場中央控制中心的真面目，中心集合機場多個部門及航空公司，全方位監察機場動向。中心設有巨型弧型顯示展，飛行區、客運大樓以至機場內外地面交通情況均可一站式監察得到。

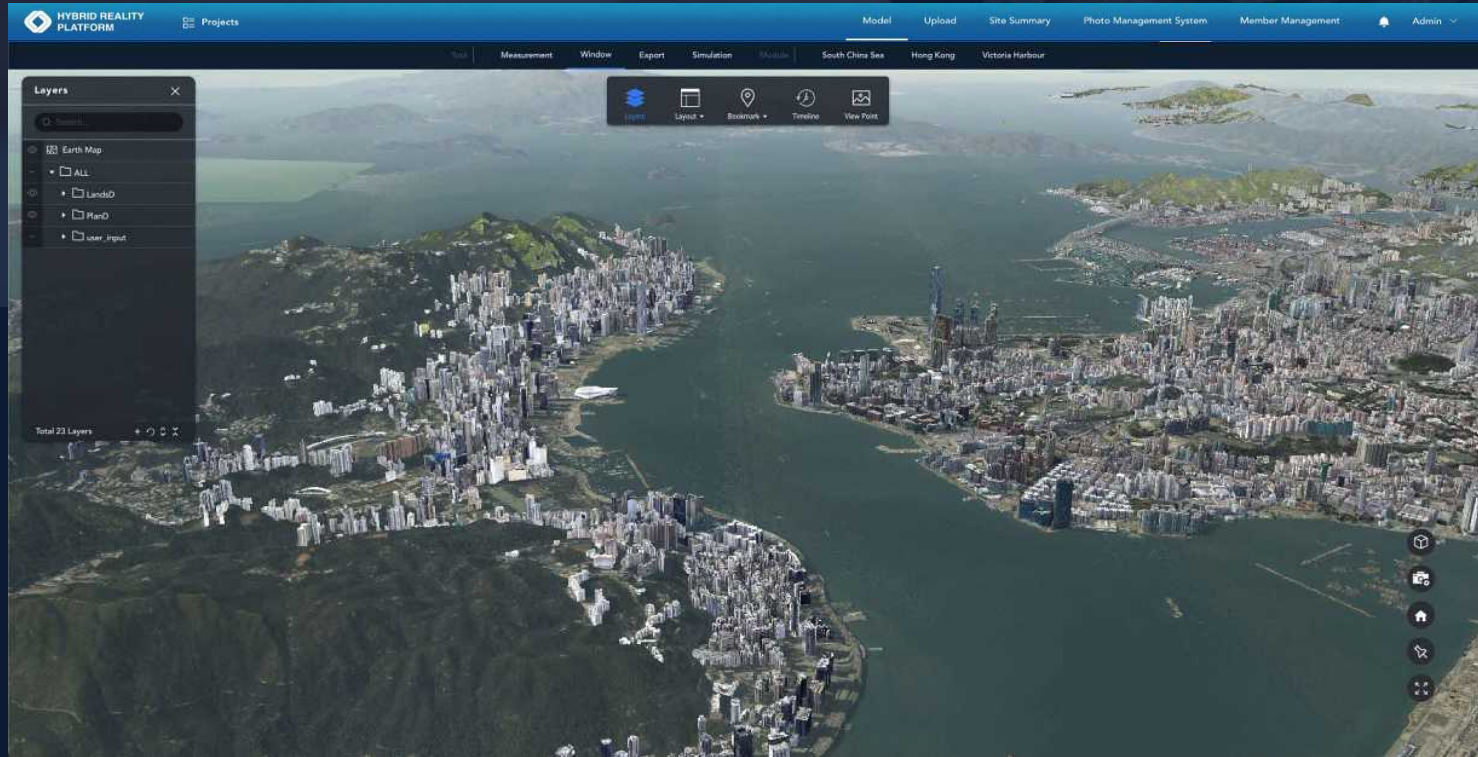
新中心倍增至162座位 安排航空公司一同進駐

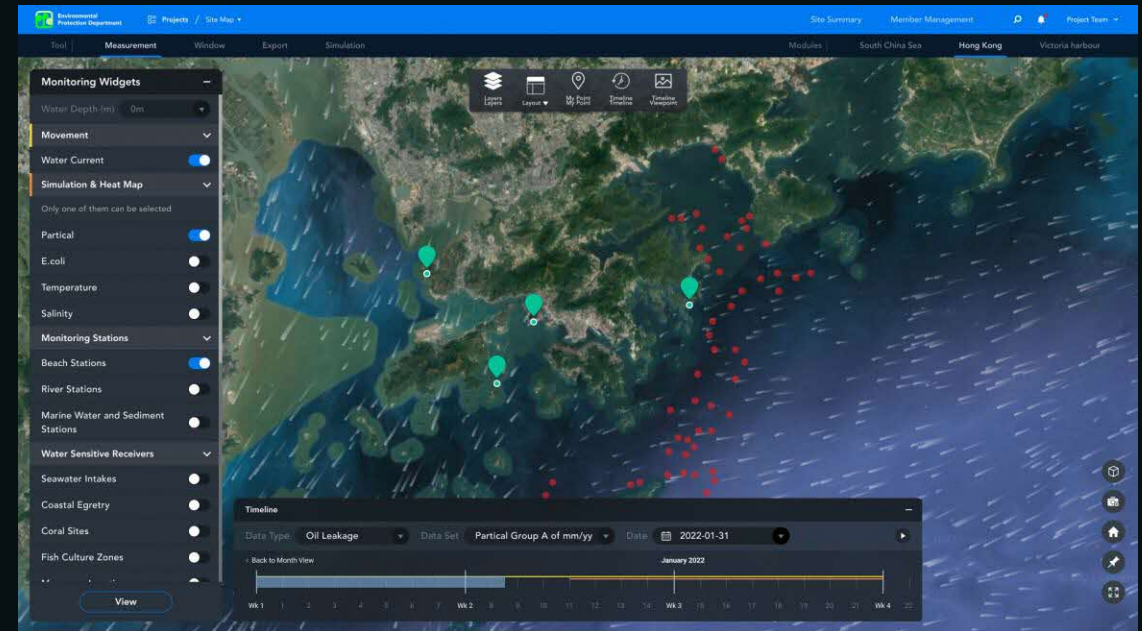
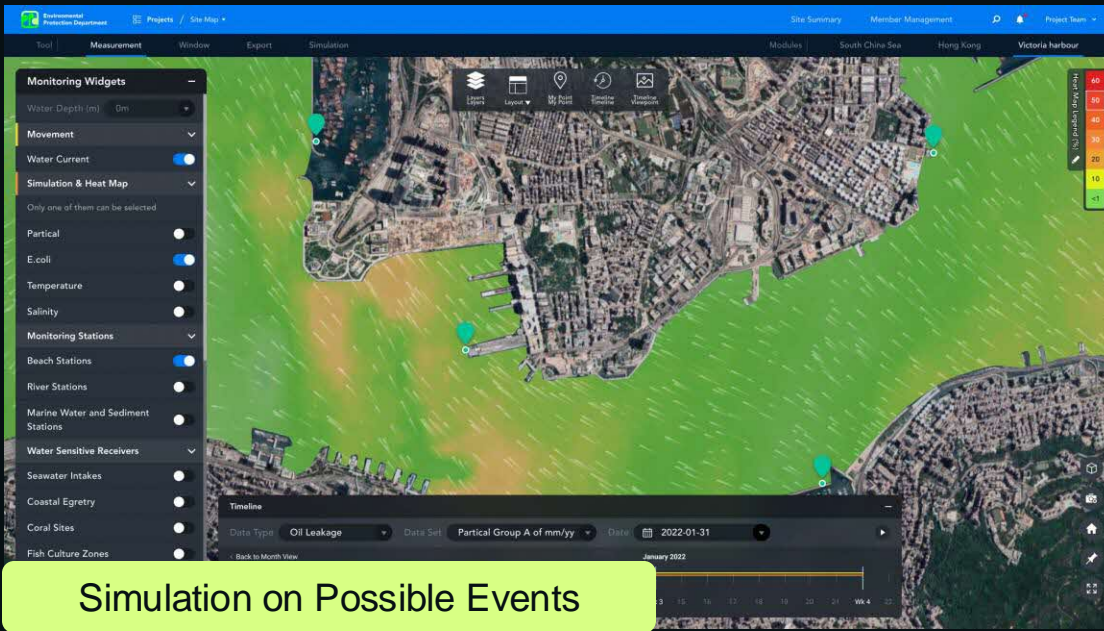
機管局機場運行副總監姚兆聰表示，第一代中央控制中心設80個座位，是全球首個將多個機場部門聚集一堂的控制中心，全球機場亦廣為仿效。他稱第二代控制中心座位增至162個，外加40個緊急應變中心座位，更首次加入航空公司，是首個機場基地控制部門及航空公司部門共治一爐控制中心，現暫時只有國泰航空進駐，未來會邀請更多公司。



Territorial Based Planning

Airports





Simulation on Possible Events



IoT Devices Integration to Enrich Synergy Effects Across Technologies



Progress Monitoring Module

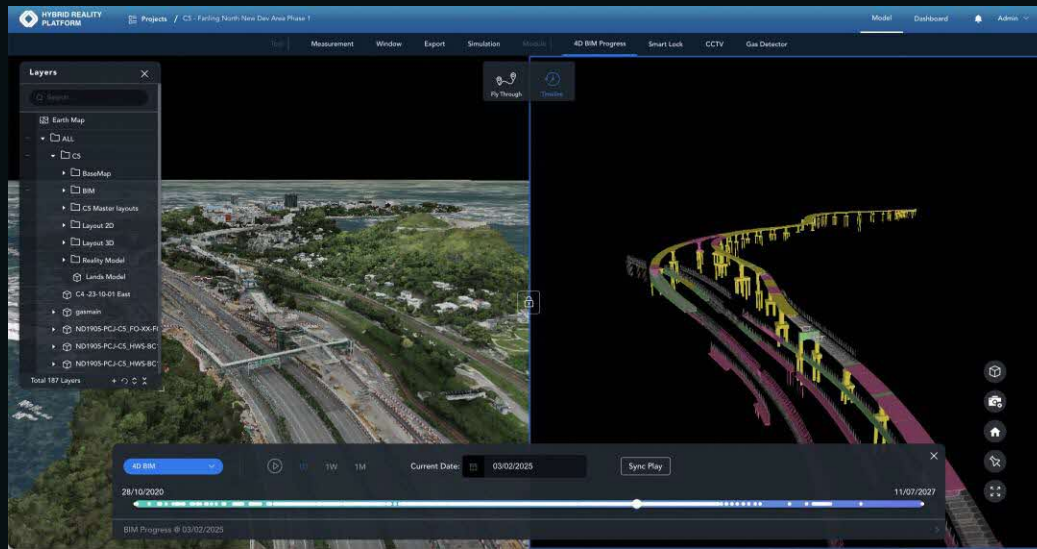
Monitoring Progress (Actual vs Planned)

- Work done dashboard integration with analysis on work trade, work discipline, form approval status and progress record
- Provide insight for better resources management for already faster or slower tasks
- Anticipate upcoming progress with proactive approach



Progress Monitoring Module

Monitoring Progress (Actual vs Planned)



Timeline Comparison of work done progress

- Ahead Start
- Ahead Finish
- On Time
- Late
- Planned Completed
- In Progress

4D BIM Progress @ 03/11/2024

Legend: On-time (blue), Ahead Start (green), Ahead Finish (yellow), Late (red), Planned Completed (pink), In Progress (orange)

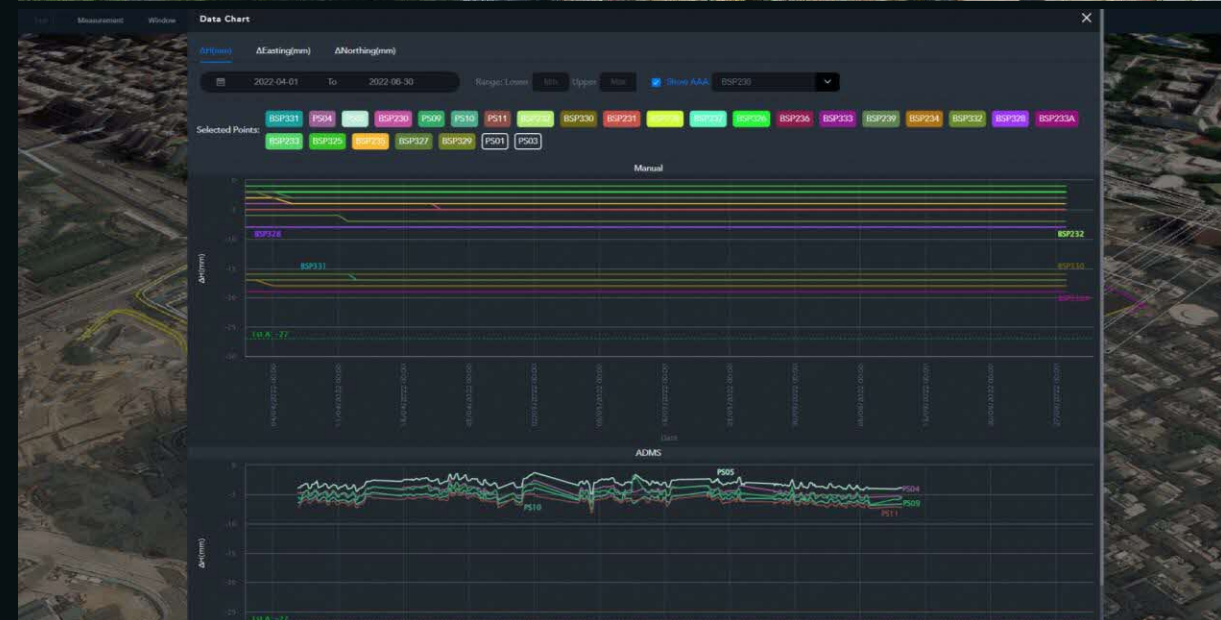
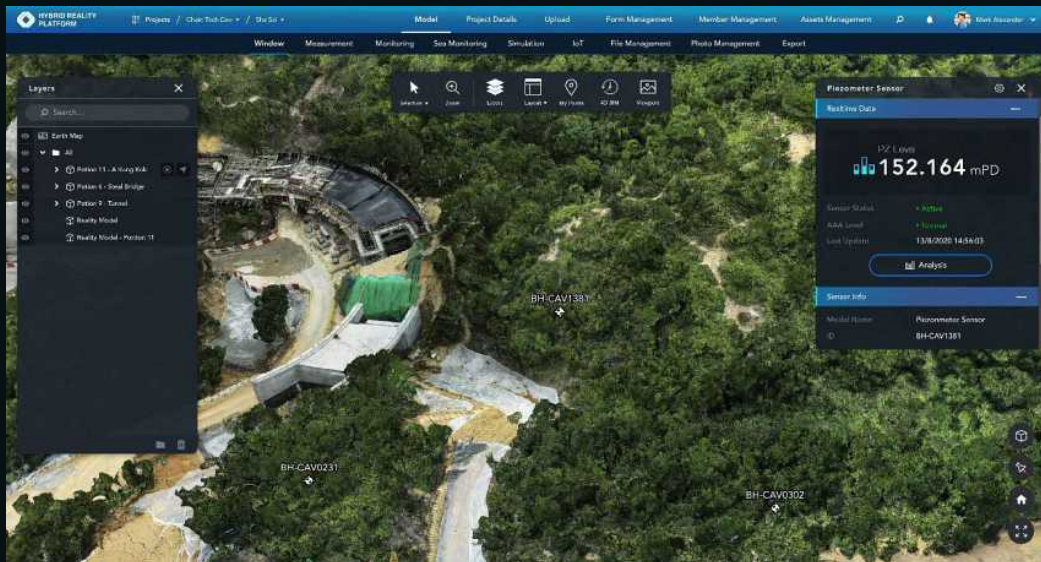
Object Id	Name	Planned Start	Planned Finish	Actual Start	Actual Finish	Δ Start	Δ Finish
FBE-1235	100110 Bus Stop - 1st Stop - 1st Stop	2024-12-23	2025-03-08	-	-	-	-
FBE-1285	100110 Bus Stop - 1st Stop - 2nd Stop	2025-03-24	2025-06-23	-	-	-	-
TSW-4580	100110 Bus Stop - 1st Stop - 3rd Stop	2025-06-15	2025-07-06	-	-	-	-



Instrumental Monitoring Module

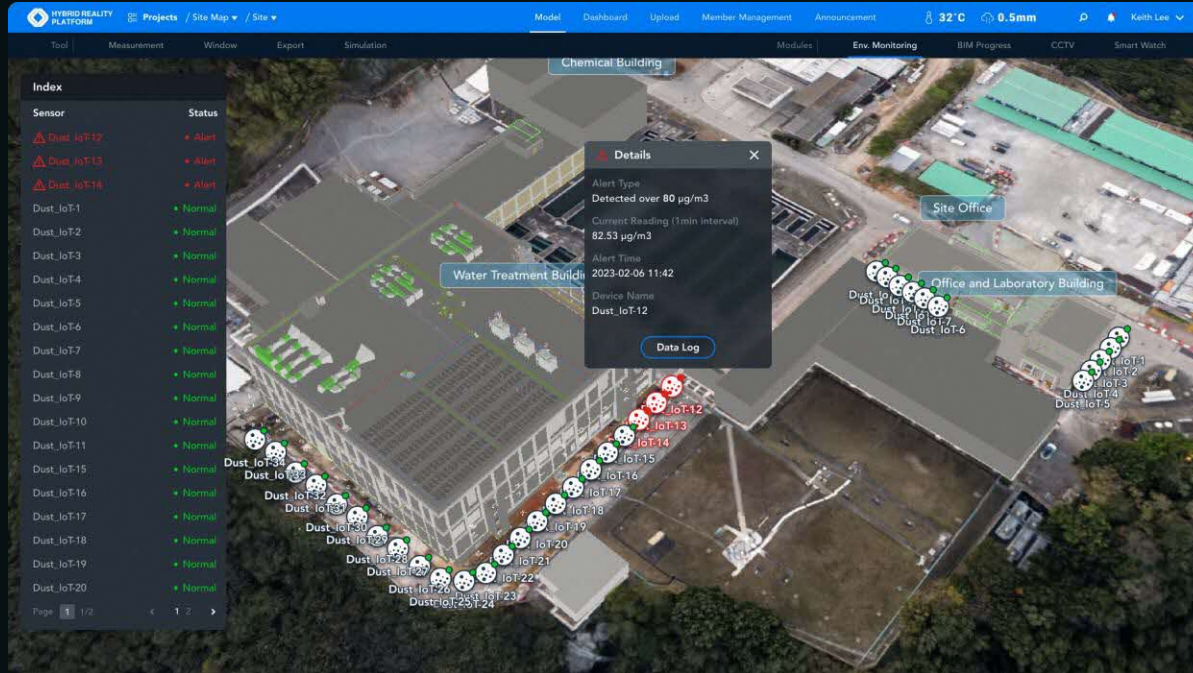
24x7 Round the Clock Proactive Alert

- Daily survey data input (Support manual survey data)
- Automatic 24x7 monitoring
 - Vibration
 - Tilting
 - Piezometer
 - Monitoring
- **AAA automatic alert mechanism**

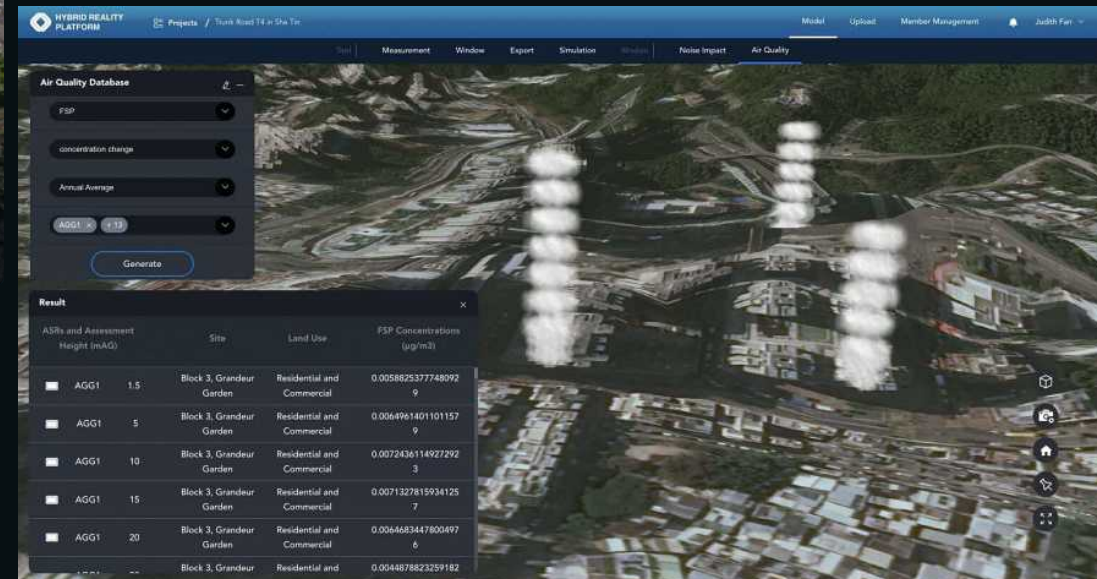
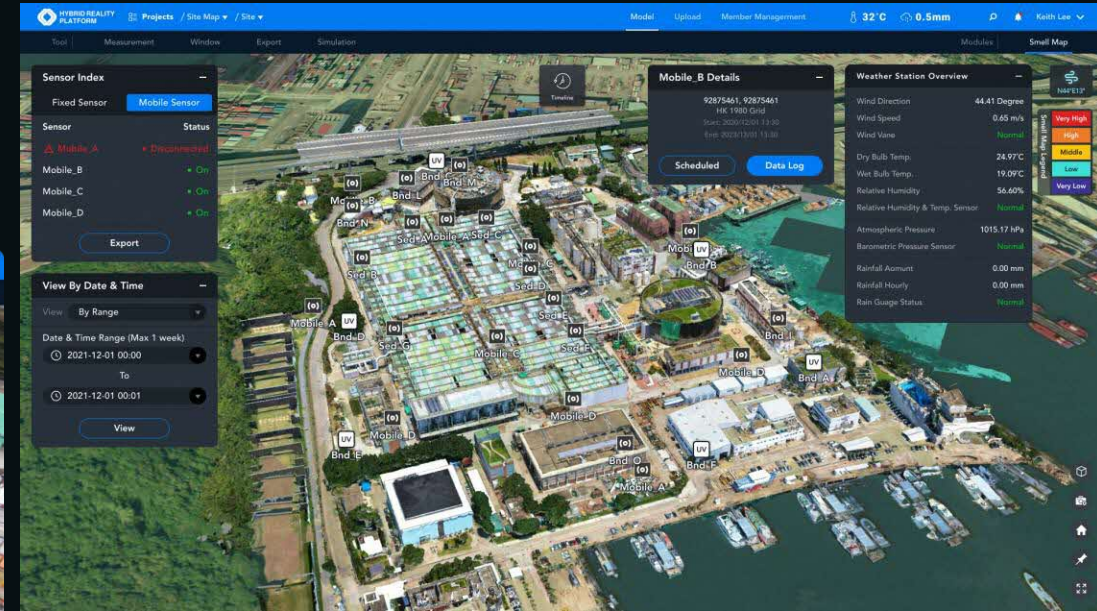


Environmental Monitoring

Air/Dust Monitoring Sensing



- Integration with environmental sensors
- Capture and visualize sensor values



HYBRID REALITY PLATFORM | Projects / Chan Tech Dev / Sha Sa

Model | Monitoring | Member Management | Mark Alexander

SIMple | CEMAR | Datalog | Converge | GEOMON | DMS | Sewage Treatment | Dashboard

Site Diary

Date: 2020/09/01

48 People on site | 5 Issues | 0 Critical Issues | 4 Equipment

Remarks: Roadworks continued, 100m of road paved, Other teams have moved onto Zone 2, Barges 28 to 4C installed.

Equipment Log

Item	Person in Charge	Quantity	Period
Mobile Crane	Erik Henderson	2	2020/09/01-2020/09/02
Cement Mixer Truck	Erik Henderson	1	2020/09/01-2020/09/02
Loader	Erik Henderson	1	2020/09/01-2020/09/02

Activity Log

Activity	Staff	Time	Status
1601_COBie.01	Erik Henderson	12:32pm	Pending
1601_COBie.01	Mark Alexander	12:32pm	Pending
1601_COBie.01	Mark Alexander	12:32pm	Finished
Base Map	Mark Alexander	12:32pm	Finished
Reality Model	Mark Alexander	12:32pm	Finished

Inspections

2 Today Inspections | 46 Total Inspections | 43 Successful Inspections | 3 Failed Inspections

Date/Time	Type	Person in Charge	Contractor Company	Status
25/01/2020, 14:00	Hydroseeding works	Andy Law	Rapid Co. Ltd.	Approved
27/01/2020, 16:00	Joint record survey for predill no. BMP-B0110	Kidita Cheung	TRG Surveying Ltd.	Approved
28/01/2020, 14:00	Concrete check	Erik Henderson	Cementalist Ltd.	Approved
25/01/2020, 10:00	Hydrostatic test	Andy Law	Rapid Co. Ltd.	Approved
31/01/2020, 14:00	Concrete Check	Erik Henderson	Cementalist Ltd.	Approved
02/02/2020, 18:00	Pipe condition	Selene Gato	Leed Ltd.	Approved
12/02/2020, 06:00	Formwork & reinforcement	Mark Hyllos	N/A	Approved
13/02/2020, 09:00	Formation	Erik Henderson	Cementalist Ltd.	Approved

RISC Form

11 Forms to Follow up | 8 Pending

Name	Issue Date	Proposed Inspection Time	Operation
RISC-BW-001	24/01/2020, 13:39:00	25/01/2020, 14:00:00	
RISC-DW-004	20/01/2020, 09:02:00	27/01/2020, 16:00:00	
RISC-WSP-005	23/01/2020, 11:39:00	28/01/2020, 14:00:00	
RISC-PS-003	22/01/2020, 07:39:00	25/01/2020, 10:00:00	
RISC-RW-009	24/01/2020, 13:39:00	25/01/2020, 14:00:00	

HYBRID REALITY PLATFORM | Projects / Chan Tech Dev / Sha Sa

Dashboard | RISC Form | Site Diary | Site Safety Inspection Records | Cleansing Inspection Checklist | Labour Return Record | Mark Alexander

RISC Form

Number of RISC Form: DD/MM/YY - DD/MM/YY | Monthly Performance: DD/MM/YY - DD/MM/YY

Total No. of RISC Form Received: 155

On Time Submission: 100 | Late Submission: 15

Pass: 110 | Fail: 5 | Outstanding for Resubmission: 2

Total No. of RISC Form Returned: 115

RISC Form Discipline Distribution

Discipline	Qty.	Pct.
Civil	20	20%
Geotechnical	20	20%
Survey	60	60%
Total	100	

Late Submission Summary

Time	Qty.	Pct.
Receive Within 1 Day	60	60%
Receive After 1 Day	20	20%
Receive After 3 Day	20	20%
Total	100	

Return Summary

Time	Qty.	Pct.
Return Within 1 Day	60	60%
Return After 1 Day	20	20%
Return After 3 Day	20	20%
Total	100	

Monthly Summary

Bar chart showing Submitted Form, Passed Form, and Rejected Form from Jan 19 to Dec 19.

Latest 12 Months RISC Status

Line chart showing Submitted Form, Passed Form, and Rejected Form from Jan 19 to Dec 19.

HYBRID REALITY PLATFORM | Projects / Chan Tech Dev / Sha Sa

Model | Monitoring | Member Management | Mark Alexander

SIMple | CEMAR | Datalog | Converge | GEOMON | DMS | Sewage Treatment | Dashboard

Simple Highlights

4 Total Inspections | 4 RISC Forms submitted | 2 Equipment

Concrete Inspections

Concrete Check #B0122: Inspection-ready

Concrete Check #B0121: Approved

Concrete Check #B0119: Approved

Temperature and Strength over Time - Ref ID: B0122

11.6 °C | 53.7 MPa

Graph showing Temperature and Compressive Strength over time (23Sep to 13Oct).

Notifications

- New check created by Simon Leung for My Photo 11
- Converge has started on inspection request for site (ref ID: B0122)
- Cris quis nulla commodo, ellip lectus and Suspend.
- Schedule is updated by Vivian Chan
- Cris quis nulla commodo, ellip lectus and Suspend.
- Schedule is updated.

HYBRID REALITY PLATFORM | Projects / Chan Tech Dev / Sha Sa

Model | Monitoring | Member Management | Mark Alexander

SIMple | CEMAR | Datalog | Converge | GEOMON | DMS | Sewage Treatment | Dashboard

CEMAR Dashboard

Change in Contract Duration

8.8% Change in Contract Duration

Origins of Price Change Trend in Current Period

Donut chart showing Scope Change (45.3K), External Non-productive Change (3.3K), and Internal Non-productive Change (2K).

Communications Dealt With On Time Over The Last 4 Quarters

Line chart showing All replies, EW replies, and Change events from Q4-1 Sep to Q4-6 Sep.

Compensation Event Status

Bar chart showing Total (474), Awaiting 1st Quotation (262), Awaiting Revised Quotation (187), CE's with Quotation Awaiting Reply (32), Accepting Quotations (34), and Party 1 Assessment (62).

Compensation Event Value Tracker

Line chart showing Quoted Value (Highest) and Implemented Value from Q4-1 Sep to Q4-6 Sep.

Holistic Dashboard Overview
Presenting the Most Essential Information of Site



All Packed



Ready to Go!



01 – Centralized Management System

02 – Digitized Tracking System



03 – Permit-to-work



04 – Area Access Control System



05 – Mobile Plant Danger Zone



06 – Tower Crane Danger Zone



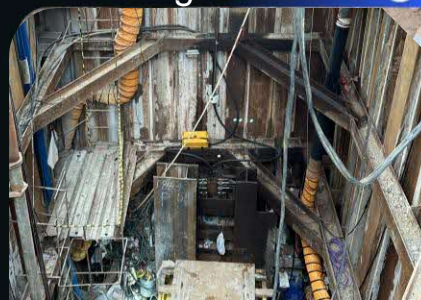
07 – Smart Wearables



08 – AI CCTV



09 – Confined Space Monitoring



10 – Safety Virtual Reality Training



Digitised Tracking System for Site Plants, Powered Tools and Ladders

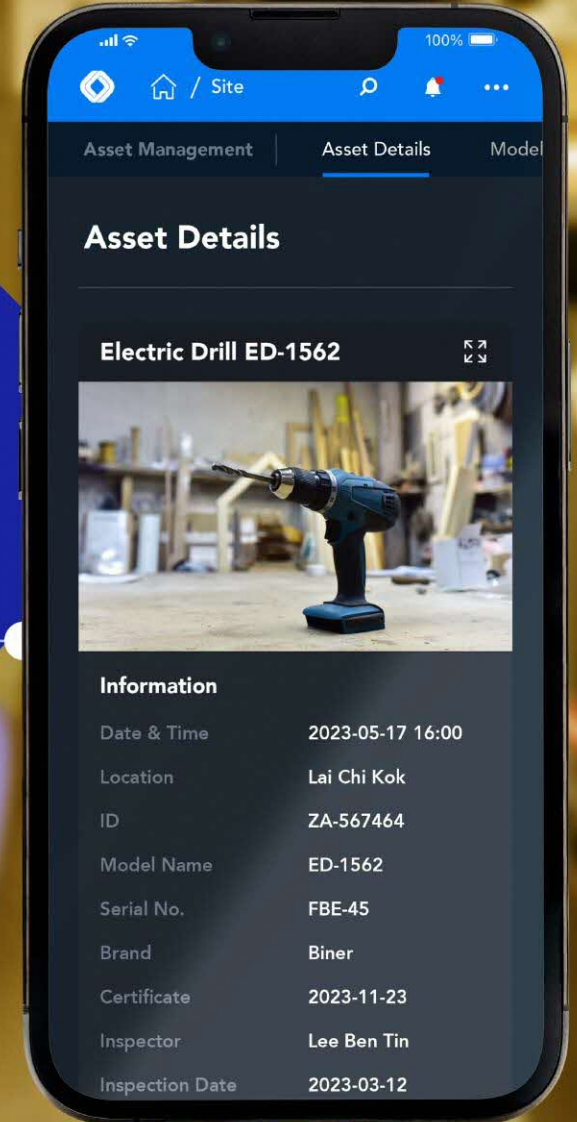
- ▶ Support real-time online Site Asset Management
- ▶ Up-to-date equipment status, test certificate, examination, checking & maintenance records
- ▶ Automatic alert notification for expired certification, overdue/scheduled maintenance



Scan the QR Code with mobile



Instantly display the latest equipment details & records





Expired Alert

Equipment [Excavator YW-1562] was due on 2023/06/05.

Predictive maintenance helps plan ahead & reduces unexpected equipment downtime

- ▶ Accurate & fast stock-taking (in stock, borrowed, missing, warranty expired, etc)
- ▶ Searching, filtering & sorting by category
- ▶ Generate asset report

Certificates Summary

Tools Status	Qty.	Pct.
Valid	420	72%
Updating	133	23%
Expired	28	5%
Total	581	

Asset Status Summary

Bar chart showing asset status over time (2021/01 to 2021/06). Legend: On Stock (Green), Borrowed (Red), Maintenance (Blue).

Assets Tracking Summary

Total of Asset(s)	152 ▲12
Asset(s) have been borrowed	76 ▼12
Asset(s) Overdue in 7 Days	8 ▲4
Asset(s) Overdue	3 ▼6

Expired Alert

Equipment [Excavator YW-1562] was due on 2023/06/05.

Asset Details

Information	2023-02-11	Equipment Category	Excavator
Date & time of scanning	Lai Chi Kok	Equipment status	On Site
Equipment location	ZA-685749832	Certificate	2022-11-23
Equipment ID	Excavator YW-1562	Inspection	Leo Ben Tan
Equipment Name	HGX-394	Purchase Date	2021-07-12
Serial no	Ref Biner	Maintenance Period	2023-10-28
Brand			

Please enter the note here.

Buttons: Noted, Approved, Rejected

03 Digitalised Permit-to-work System for High Risk Activities

- ▶ E-application, approval / rejection of permits via mobile
- ▶ Automatic alert notification for pending tasks, results & expired permits
- ▶ KPI dashboard review & analysis



Safety Monitoring System Using Artificial Intelligence

- ▶ Continuous real-time AI CCTV-streaming covering all site areas
- ▶ Detect & classify unsafe scenarios with accuracy higher than 90%



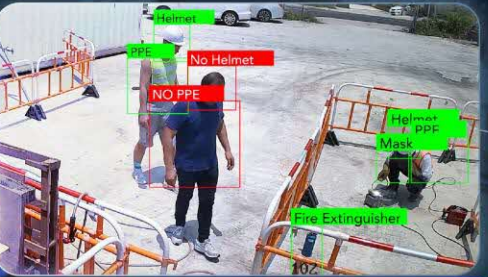
AI engine trained up for all-round **safety, progress, traffic & environmental** monitoring



Unauthorised entry to danger zones



Workers laid down



No PPE (Safety helmet, safety vest, mask, etc)

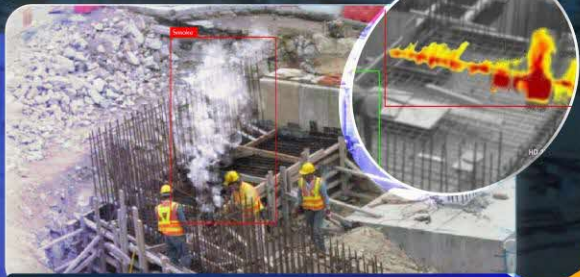
Device	Status
AI-CCTV-02	Live
AI-CCTV-10	Off
AI-CCTV-01	Live
AI-CCTV-03	Live
AI-CCTV-04	Live
AI-CCTV-05	Live
AI-CCTV-06	Live
AI-CCTV-07	Live
AI-CCTV-08	Live
AI-CCTV-09	Live
AI-CCTV-11	Live
AI-CCTV-12	Live
AI-CCTV-13	Live



Working at height: No safety harness



Workers near site vehicles



Fire & smoking



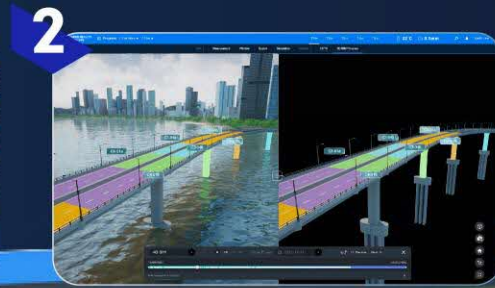
Marine work: No life jacket



Car plate & no dump truck cover



Digital Twin



4D Progress Management
(SSSS + DWSS + Construction Program)



Geotechnical Monitoring
(Settlement, Tilting, Vibration)



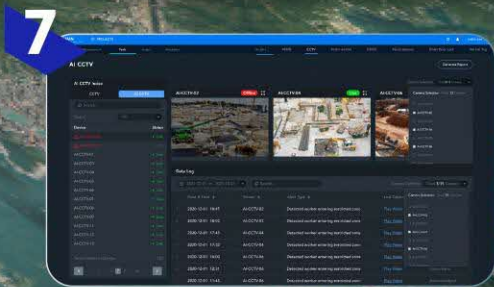
Environmental Monitoring
(Air & Dust, Noise, Weather)



Asset Management
(SCADA & MAXIMO Integration)



Worker Management with Smart Wearables



AI CCTV Monitoring



Mobile Chatbot & Automatic Alert Centre



Traffic Monitoring



Dashboard Summary Analytics

Cross-functional Synergy for Different Construction Stages



Bim Layer File Index

Form Name	File Size
F:\Bim\BimFormet	15kb
F:\Bim\BimFormet	15kb

DWSS Forms Index

Form Name	Type	Workon
0000011	0003	Portion 1

Upload Bim Layer

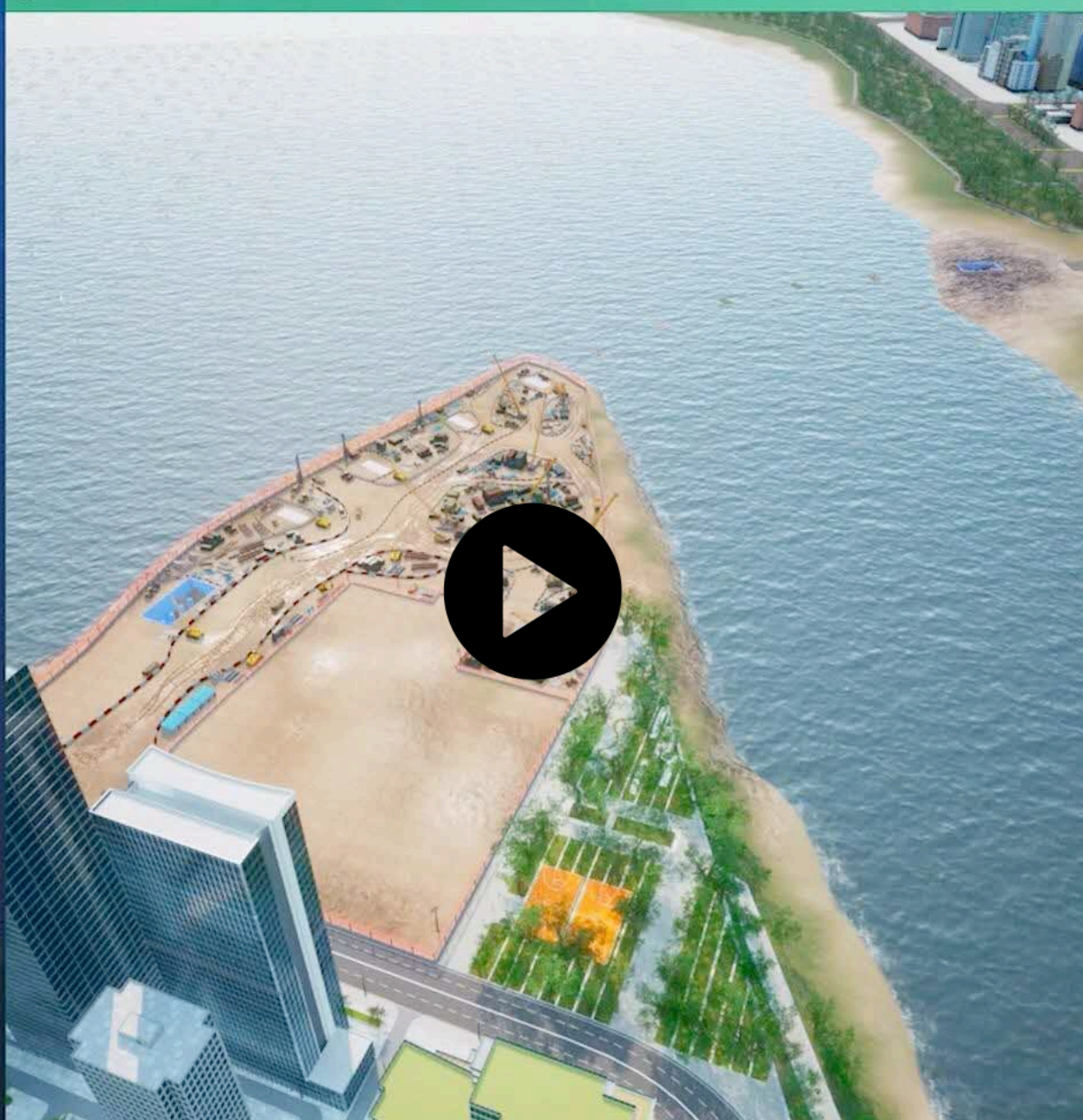
Upload File:

Upload Button:

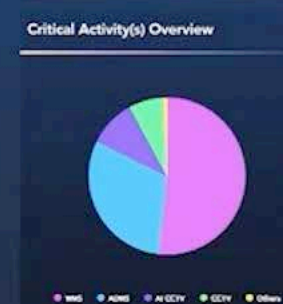
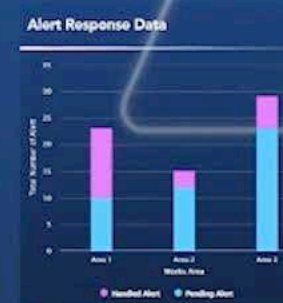
Submit DWSS Form

CDT/RISCF/2022/R000011
 Update Time: 2022/12/12 23:03
 General cleaning for work
 GL PS-P12 / EPA-EP8 & 12F at GL P1
 Inspection Time: 2022/12/14 23:03

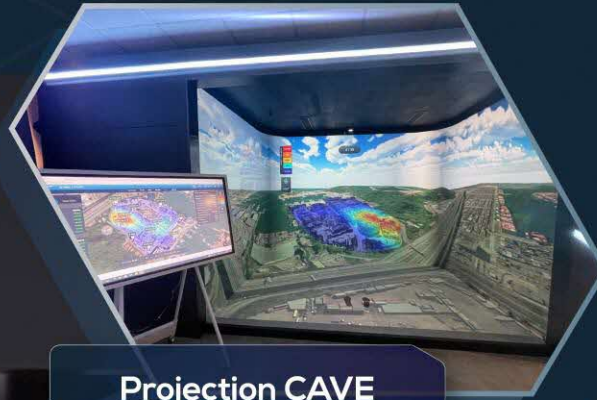
Submit Button:



測紀錄系統」，取得有關檢測紀錄，以助工地直核。議會、商會及政府



CHAIN



Projection CAVE



LED CAVE



MiC CAVE



Projection Tunnel

- ▶ 4D immerse yourself in human 1:1 open world.
Customise CAVE interior & exterior for public engagement.

Adoption of CAVE System



Promotion and Public Engagement



Data Management and Visualization

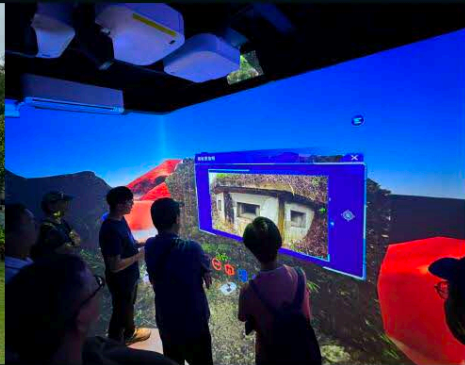


Construction Simulation





MIC CAVE for HK History Education



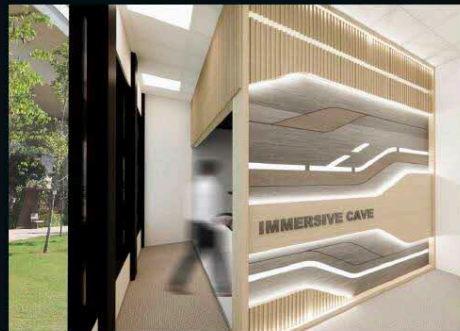
Smart HK Visualization



Future Transportation Initiative



Construction Site VR Training



Future Infrastructure Development Public Engagement



CLC Center for Public Consultation



Urban Design and Planning



Mobile Truck CAVE Training Center



MIC CAVE for HK Water Supply Education





Props - Bike / Car Seat



OptiTrack / Xbox Controller



Props - Fire Extinguisher

CHAIN

IMMERSIVE CAVE



Multi-touch Wall Motion Sensing



Kiosk



Mobile

Make every interaction count



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Learn more at

chaintechdev.com

**Thank
You!**