



Transforming JTC's Construction Management with Reality Capture Technology



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Future of Building & Infrastructure Division (FBI)

29 MAY 2026

[CONFIDENTIAL/SENSITIVE NORMAL]



Introduction

We build estates, ecosystems and communities to develop Singapore's Industries

86% of Singapore's industrial land owned by JTC

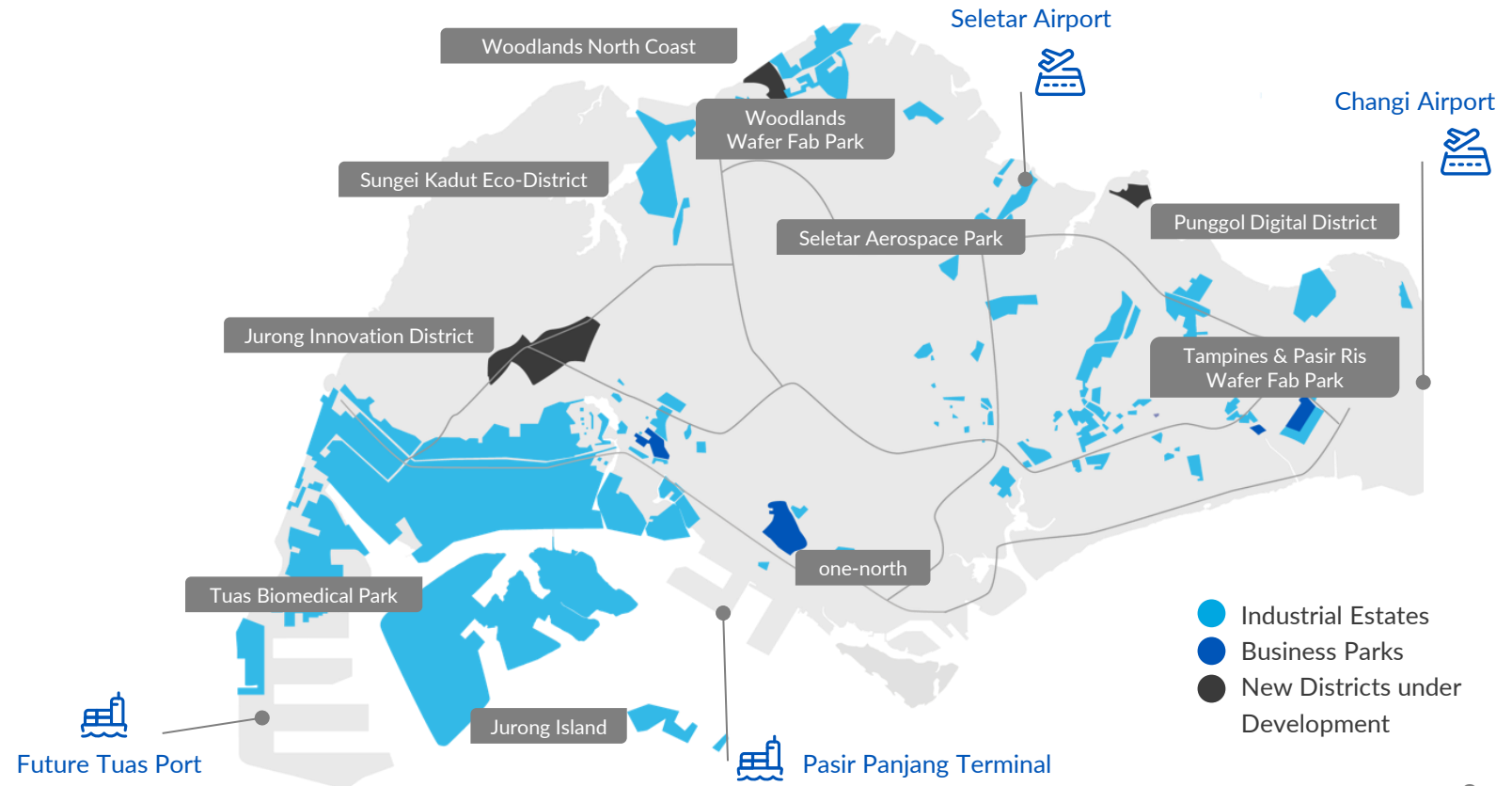
8,420 ha
Nett industrial land stock

7.7 million sqm
total industrial space

~13,000
customers across various sectors

A government agency under the Ministry of Trade and Industry, JTC was founded in 1968 to grow Singapore's manufacturing landscape and support the nation's economic goals.

We build industries and develop clean, green, and smart estates so that Singapore stays innovative, dynamic, and sensitive to global manufacturing trends.



We wear many hats

JTC is more than just an industrial landlord. In fact, we play several key roles to catalyse the growth of new industries and transform existing enterprises:



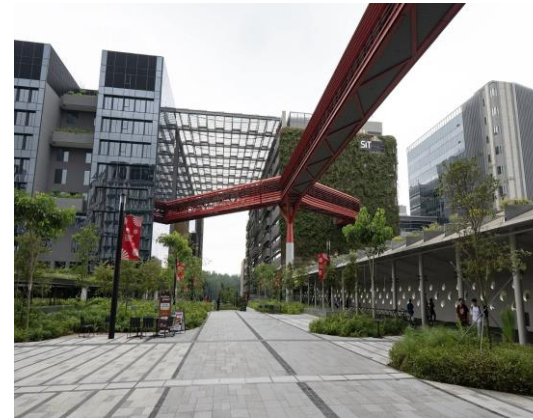
Building

JTC manages complex, high-value building projects above \$25 million for agencies lacking in-house capabilities, taking on nationally significant developments such as the New Science Centre, Kallang Indoor Arena, and Restoration of The Istana.



Infrastructure/Reclamation

JTC delivers project management for large-scale, strategically important infrastructure works, including the Integrated Cruise and Ferry Terminal, Woodlands Checkpoint, and underground cavern developments, leveraging deep technical expertise in engineering and rock mechanics.



Facilities Management

JTC has a facilities management group that maintains and serves more than 100 JTC buildings. In addition, JTC provides FM advisory and consolidation services to government agencies, driving cost efficiency and improving manpower productivity.



CentEx

JTC leads the whole-of-government built environment community by providing expertise across the full development lifecycle from conceptualisation to operation, driving R&D, and uplifting public sector capabilities through training and industry engagement.

Integrated Digital Delivery Across Entire Value Chain

Digitalising and integrating the entire value chain

District Data
Machine Learning
Data Analytics
Artificial Intelligence

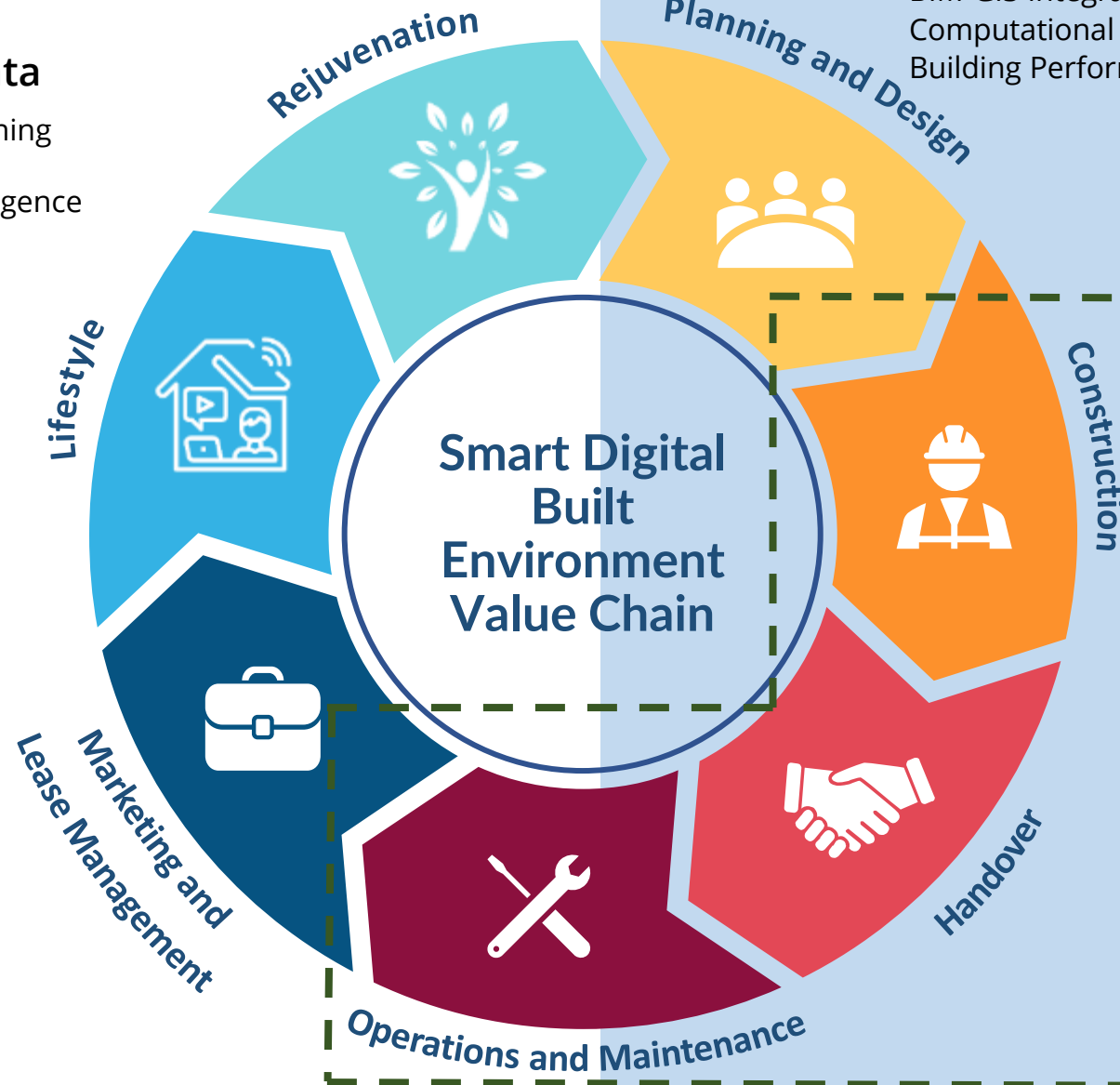
Customer Portal
Marketing
Leasing
3D Walkthrough

Enhanced User Experience

E-payment
Smart Parking
Access Control
District App
Smart Retail

Centralized Platform (ODP)

Smart Facilities Management
Connected Estate Systems
Data Sharing Platform
Virtual Twin
Analytics Capabilities



Content Creation & Checks

BIM-GIS Integration
Computational Design
Building Performance Analysis

Project Delivery Management

Submission Module
File Management Module
Records Module
Project Management Module
Project Reporting Dashboard
Payment Module
Model Server
Corp Data Hub

Construction & Resource Management

Project Progress Module
Manpower Management
Access Control
Defects Management
Reality Capture
Integration with site installations and devices:

- Bluetooth Tracker/Wearables
- Drones, CCTV, AI Cameras
- Biometric Gantries

Why we deploy reality capture technologies



JTC Logistics Hub



Semiconspace

Reality Capture Tools Deployment






Construction

-  Surface Flatness Analysis
-  Design and As-Built Deviation Check
-  Site Progress Monitoring
-  As-Built BIM Validation





Handover

- Virtual TOP Inspection  
- Virtual Road Handing Over Inspection 

Reality Capture Tools Deployment

Operation & Maintenance

- Periodic Structure Inspection (PSI) 
- Building Façade Inspection 



LiDAR



360° Photo

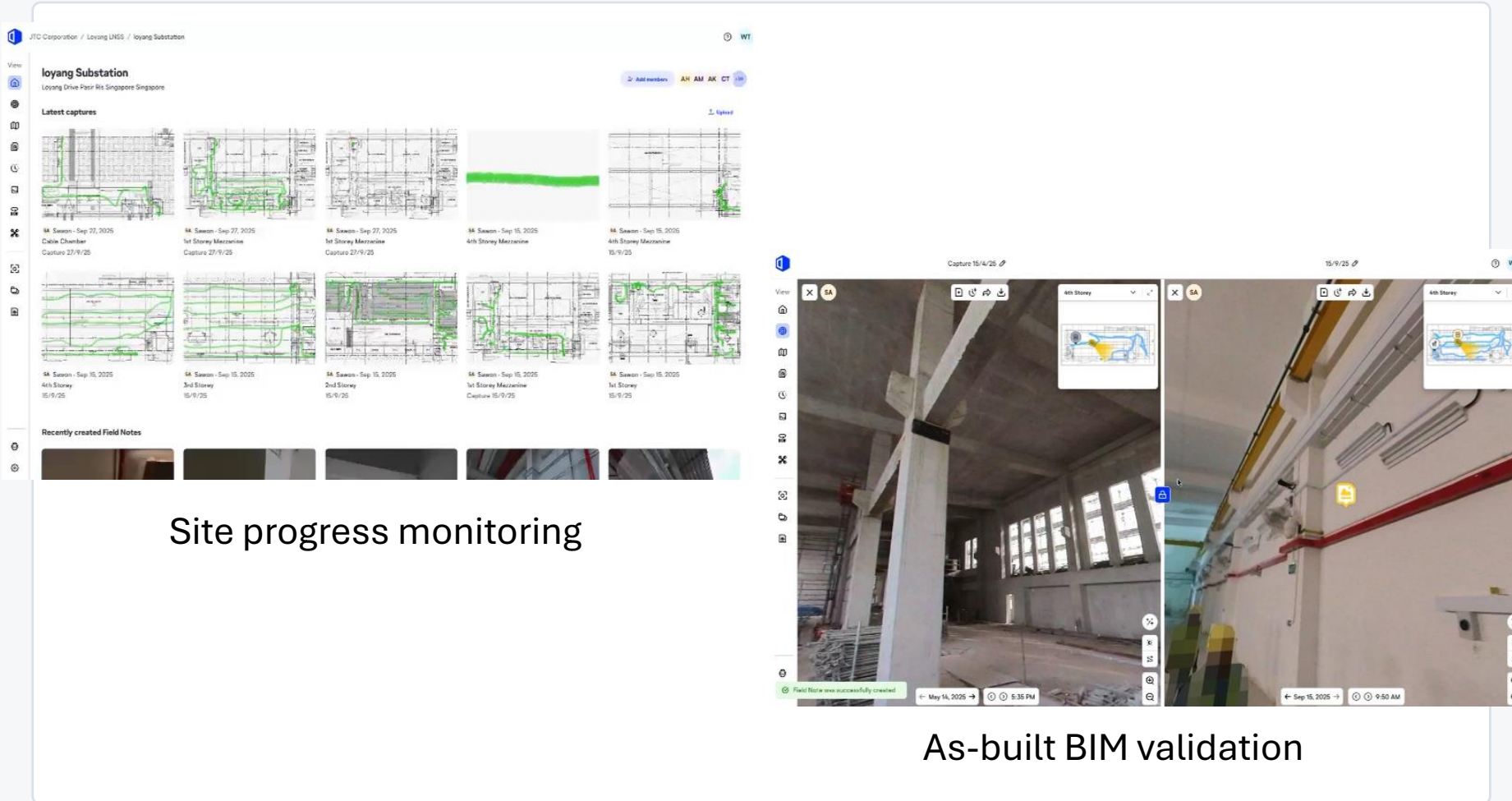


Drone

Site Progress Monitoring & As-Built BIM Validation

How It Works

Use 360-degree photo platform to monitor and verify site progress across different timeline



The screenshot displays a software interface for site monitoring. On the left, a sidebar shows the project name 'Iyong Substation' and a list of 'Latest captures' with thumbnails and dates. Below this is a section for 'Recently created Field Notes'. The main area features two large 360-degree photo views of the construction site, one showing a wide view of the interior and another showing a closer view of a wall with pipes. A map inset is visible in the top right of each photo view.



Site progress monitoring

As-built BIM validation

Deployment

- Applied to 10 JTC buildings projects and 5 of JTC's infrastructure projects
- To be adopted for all future JTC building and infrastructure projects.

Existing Vendors

- Openspace 
- Airsquare 

Savings

59 man-days

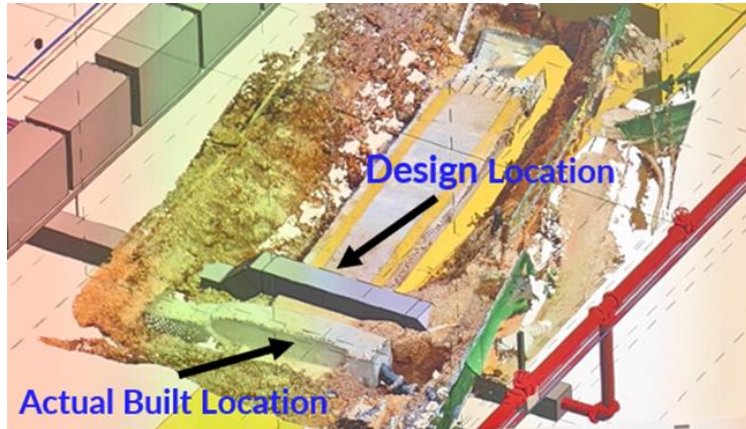
Per PM/project

In travel and verification checks

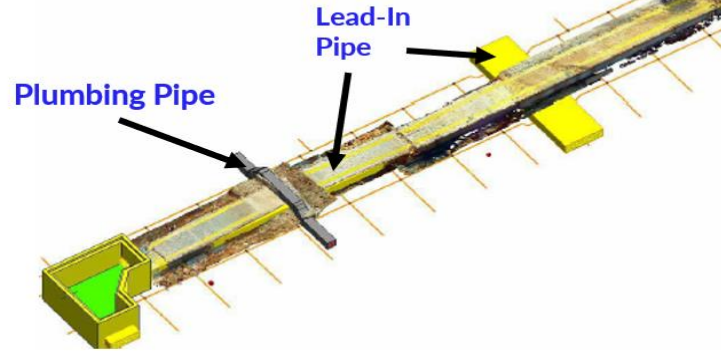
Design and As-Built Deviation Check

How It Works

Using LiDAR Scanning

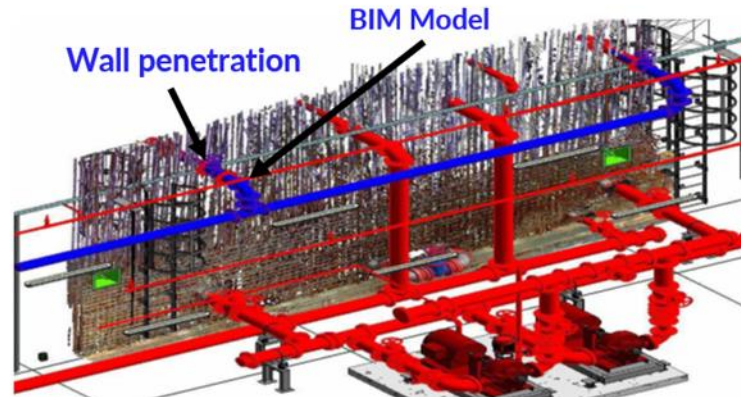


Plumbing pipe and lead-in pipe on actual site aligned with BIM model

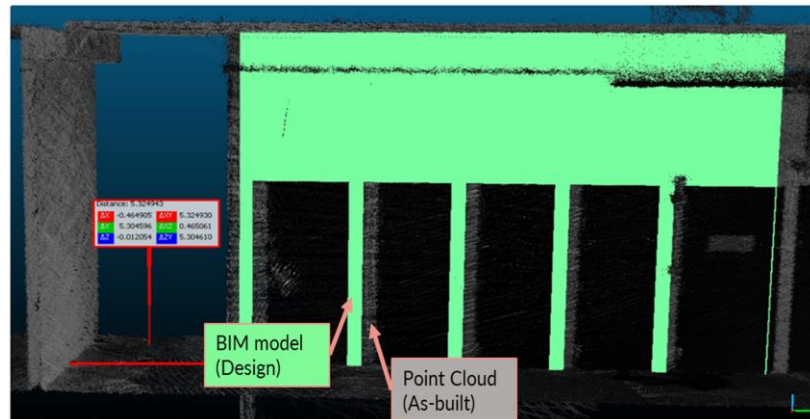


POINT CLOUD + Design BIM MODEL

Wall penetration provision aligned with BIM model



POINT CLOUD + Design BIM MODEL



Deployment

- Applied to more than 12 JTC buildings projects.
- Specified in JTC requirements. To be adopted for all future JTC building projects.

Existing Vendors

- Faro
- Trimble
- Leica



Savings

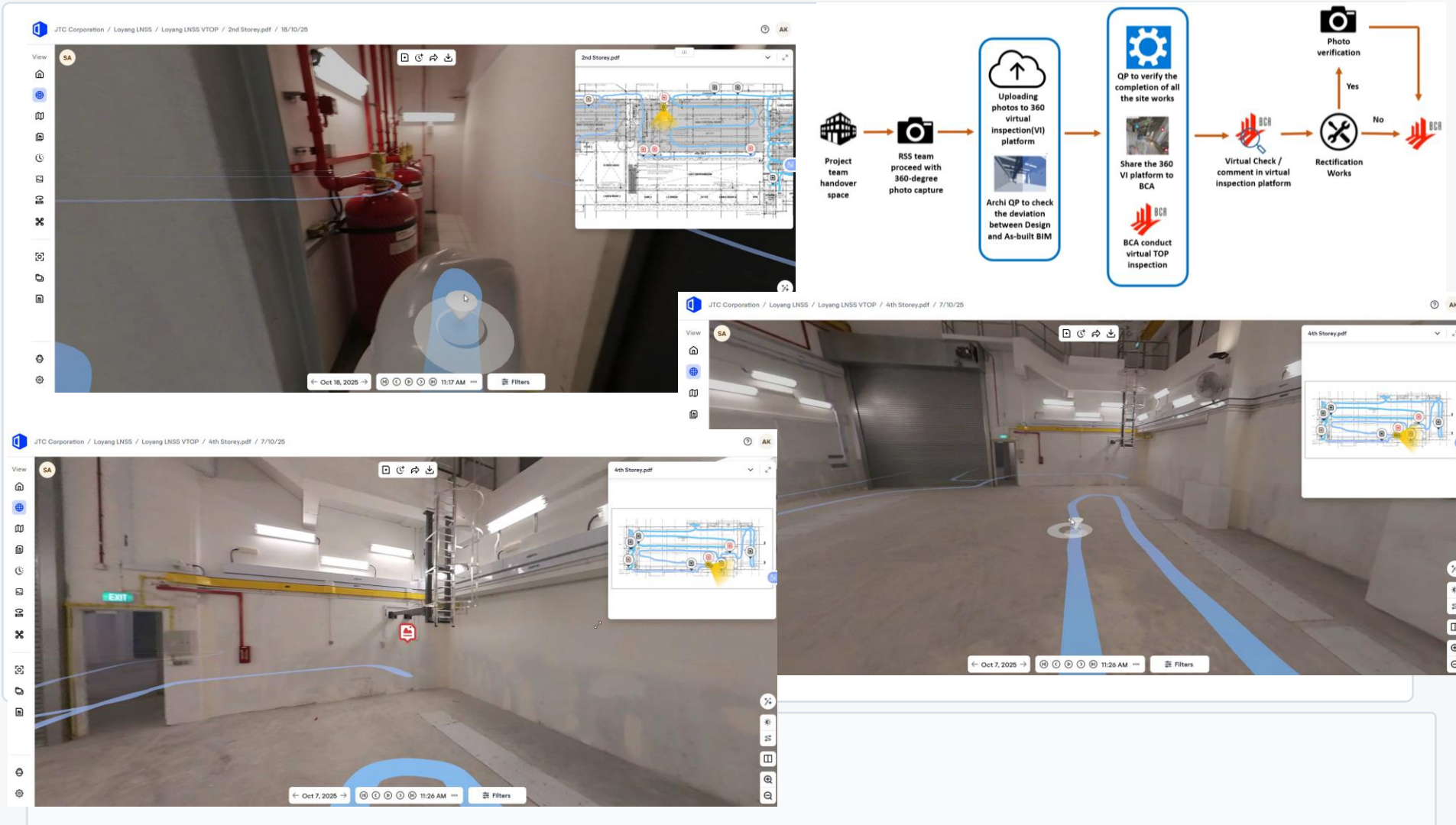
6 man-hours
Per inspection/trade

For as-built & design deviation check

Virtual TOP Inspection

How It Works



LiDAR Scanning and 360-degree Photograph Capture



Deployment

- Deployed to 5 JTC building projects.
- Specified in JTC requirements. To be adopted for all future JTC building projects.

Existing Vendors

- Openspace 
- Airsquare 

Savings

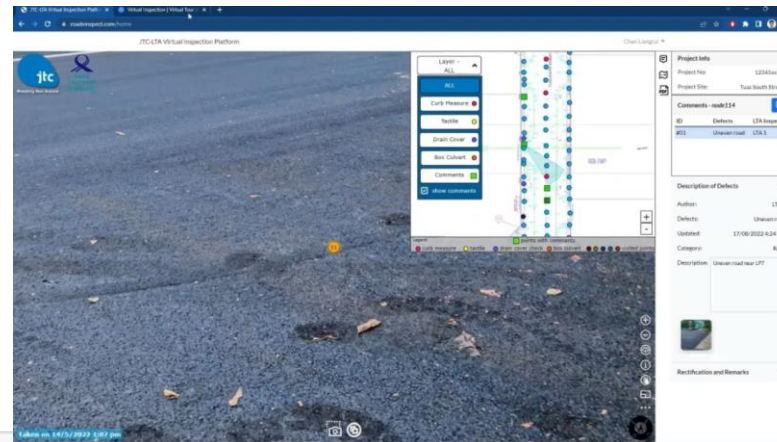
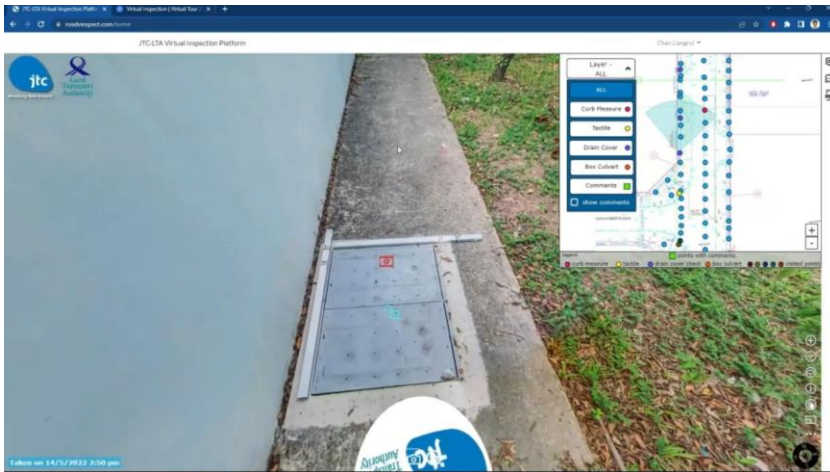
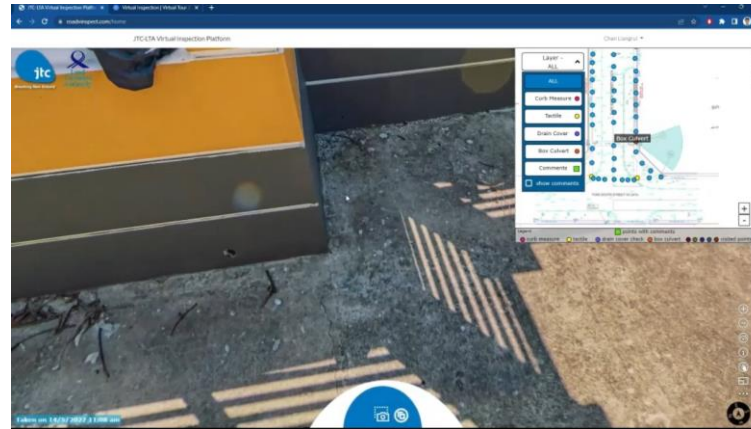
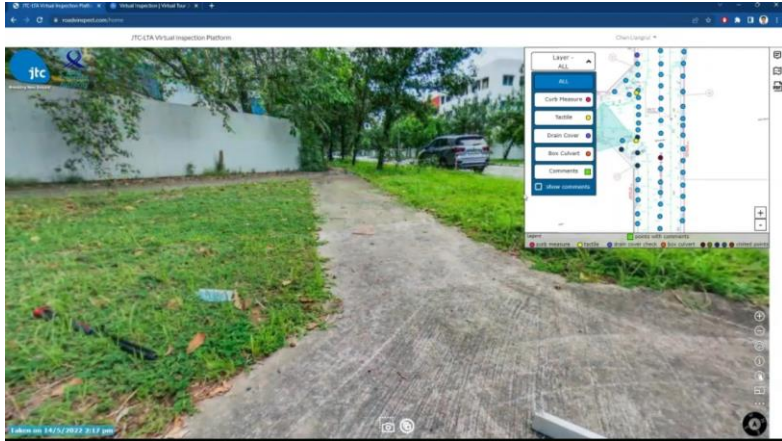
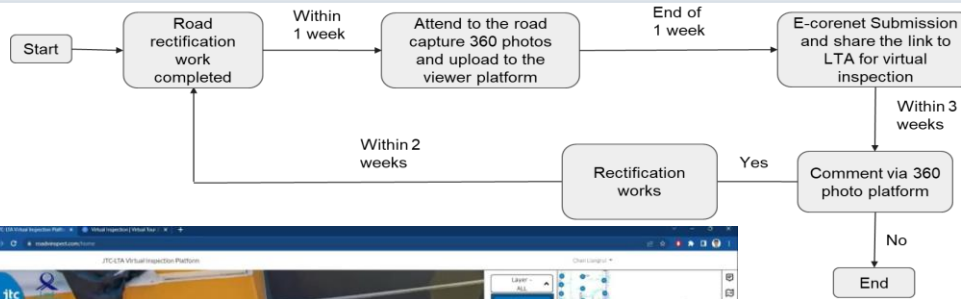
66 man-hours
Per inspection

To attend physical inspection and record follow up

Virtual Road Handing Over Inspection

How It Works

Using 360-degree Photograph Capture



Deployment

- Applied to more than 25 roads and handed over to LTA.
- To be adopted for all future JTC infrastructure projects.

Existing Vendors

- XY23 Studio
- Openspace
- Airsquare



Savings

43 man-hours
Per inspection

For travel, handover, inspection and report generation

Surface Flatness Analysis

Detect & Fix Defects Before Concrete Hardens

How It Works

using LiDAR Scanning

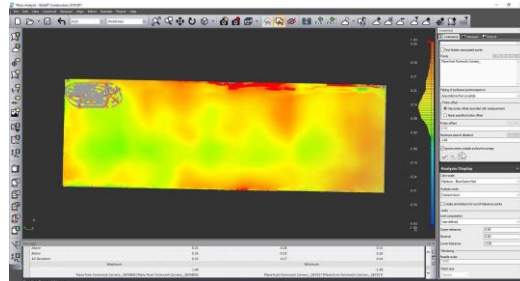
1 LiDAR scan

Prior to concrete hardening



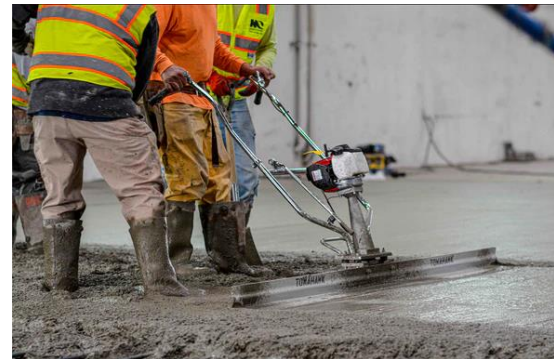
2 Surface Analysis

Convert point cloud scan to heat maps, contours and grid points



3 Immediate Rectification

Uneven areas instantly highlighted and fixed



Traditional method

1. Slab is cast & concrete allowed to harden

2. Check for levels using Spirit Level

3. Rectify uneven spots (>3 hours)

4. Re-check FF/FL

Deployment

- Applied to more than 12 JTC buildings.
- Specified in JTC requirements. To be adopted for all future JTC building projects.

Existing Vendors

- Faro
- Trimble



Savings

28 man-hours
Per casting
rectification (2 spots)

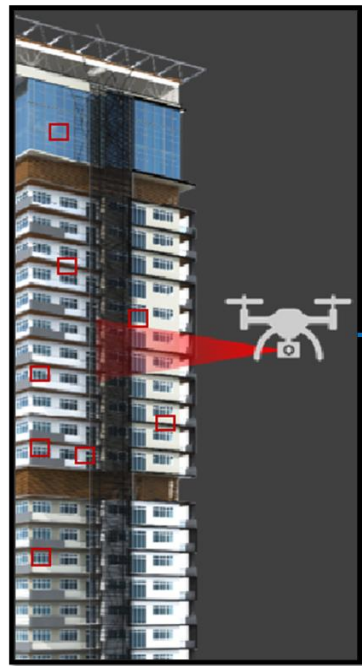
Building Façade Inspection

How It Works

Using Drone

1 Deploy drones

Capture building façade defects during periodic façade inspections

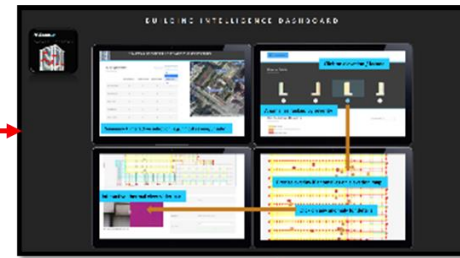


(1) Image Capture & Upload



(2) Review and Validation by Professional Engineer

(3) User Interface & Visualization



(4) Report Generation



Traditional methods:

Gondolas



Scaffolding

Mobile Cranes

Deployment

- Deployed to more than 30 JTC industrial properties/projects.
- Specified in JTC's building facade inspection requirements and will apply to all buildings.

Existing Vendors

- H3 Zoom 
- Avetics Global 

Savings

20 man-days

Per inspection

For inspections

Smart Periodic Structure Inspection (PSI)

How It Works

Using 360 photo and conventional photo

1 Capture & Analyse visual data

2 Early Detection of defects

Cracks, spalling, corrosion, termite trails

3 Supports tracking of deterioration trends, Facilitates generation of reports for timely intervention



Deployment

- The solution has been deployed at over **86 sites**, including JTC buildings, schools, and commercial properties.
- To be adopted for all future JTC buildings.

Existing Vendors

- Vebits 

Savings

4 man-days
Per inspection

For report generation

DO MORE WITH LESS

SLOW & LABORIOUS ↓

Traditional Manual Inspection:
Time-consuming, physical presence required, safety risks.

EFFICIENT & DIGITAL ↑

Virtual Inspection:
Remote access, real-time data, comprehensive analysis, safer.

Captures
360 captures

View: [Dropdown]

| Location | Status | Time | By |
|------------------------|---------------------|-------------------|----|
| Site Plan | 22, 2025, 11:15 AM | By Corine | |
| Ca&Id Chamber | ON 15F/115 | | |
| 1st Storey | Captures 27/25 | | |
| 1st Storey Mezzanine | VIEW CAPTURE | | |
| 2nd Storey | | | |
| 3rd Storey | | | |
| 4th Storey | 17, 2025, 9:00 AM | By Marvin Masaray | |
| 4th Storey Mezzanine | ON 18F/115 | | |
| Roof Level (M&E) | Captures 27/25 | | |
| Rot | VIEW CAPTURE | | |
| Sep 27, 2025, 10:30 AM | | | |
| | By Jiv-dia Cruzanne | | |
| | ON 13F/155 | | |
| R4 | Captures 27/25 | | |
| | VIEW CAPTURE | | |
| Yesterday, 9:00 AM | | | |
| | By Zoely Monteciel | | |
| | ON 15F/135 | | |
| | Unlinked Capture | | |
| | PREVIEW CAPTURE | | |
| Sep 15, 2025, 8:30 AM | | | |
| | By Spencer Lagapi | | |
| | ON 15F/155 | | |
| 15/9/25 | | | |
| | Unlinked Capture | | |



Sungei Kadut Eco-District

Thank you.

