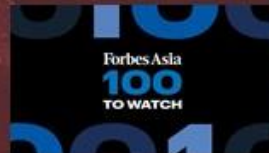


# RaSpect

AI for Safety of Building Facades

SAFETY FORUM 2023 (HA)

28 September 2023 (Thursday)



RASPECT INTELLIGENCE INSPECTION LIMITED

## Win-Win Partnership: Elevating AI Built Infrastructure Inspections

**Shared Vision:** Setting new industry benchmarks, optimizing processes, and fostering a more sustainable tomorrow.

**Sustainability Stewardship:** Reducing the ecological footprint of real estate activities through advanced, responsible practices.

**Industry Transformation:** Uniting industry expertise with cutting-edge technology for a revolutionary approach to real estate operations.

**Our Commitment:** Together, we innovate, elevate, and create a positive legacy for the real estate sector and the world.

**RaSpect**





# Positioning

We are dedicated to establishing a strategic alliance with professional engineers, capitalizing on our pioneering **AI Big Data and robotics technology** to drive innovation in built infrastructure inspection.

Through seamless digitalization integration, our goal is to augment engineers' scope of work and **empower engineers with a distinct competitive edge.**





## Over half of 7,000 old Hong Kong buildings with inspection notices have yet to be reviewed, official says after second case of falling debris

- Director of Buildings Clarice Yu reveals 4,000 old structures have not carried out compulsory inspections
- Figures released after concrete and plaster chunks fell off residential building, raising safety concerns

Hong Kong has recorded at least 18 incidents of concrete and debris falling from buildings since July, with some cases leading to pedestrians being injured or damaging vehicles.



**30 buildings to undergo emergency repairs by mid-September, Hong Kong's development chief vows, after string of falling concrete cases**

**Half of 47 ageing Hong Kong buildings at 'immediate risk', inspection discovers after spate of cases involving falling concrete**

Temporary protective measures, including scaffolding and nets, have been in



# Customer Demands



## Misses Critical Defects

" Human inspectors may inadvertently overlook subtle or hard to detect defects in building facades, posing potential safety hazards leading to significant repair costs. "

Property Owner



## Costly Operations

" We would like to inform (buyer) owners that we offer long-term quality assurance service, but the traditional approach can't meet my demand. "

Real Estate Developer



## Inefficient Building Lifecycle Management

" Inaccurate or incomplete inspection data can lead to suboptimal maintenance planning and management, missing opportunities for preventive measures and ultimately resulting in increased maintenance expense for property owners. "

Facility Manager



## Limited Accessibility

" Some building's facades present difficult-to-reach areas, especially in high-rise or complex structures. The limitation of Manual access may hinder the effectiveness of inspections and compromise the thoroughness of data. "

Registered Engineer & Building Surveyor



## Time Consuming Inspections

" It's difficulty in meeting urgent scenarios. Because Limited scalability for handling multiple projects simultaneously and time-consuming which can take months to complete. "

Government

# Value Proposition



## Smart

- AI-based Defect Detection & Analysis
- High Accuracy of Data Localization
- 3D Navigation with BIM and GIS Integration
- AI Defect Dimensioning



## Efficient

- 64% More Efficient Workflow & Team-Work Using Cloud Platform
- 100% Digitized Building Data and Inspection Report on Cloud
- AI Face Blurring and Privacy Filter
- Automated Report Generation



## Cost Effective

- 67% Faster Data Capture
- 65% Faster Report Generation
- Worker Risk Free
- 50% off Project Cost



# Solution: Improve Inspection Efficiency by 64%

1



2



3



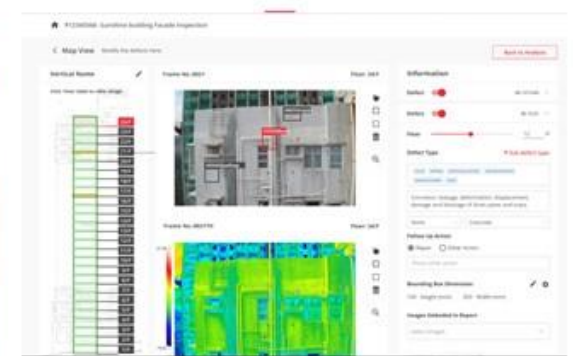
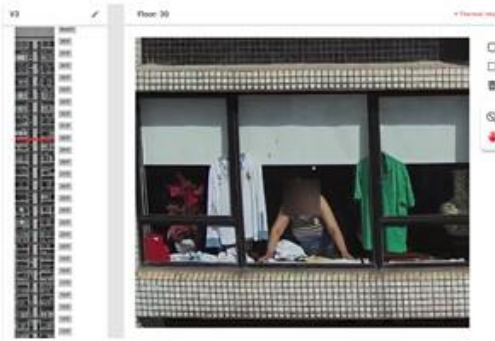
4

Autonomous Data Capture

Data Upload, AI Data Positioning

AI Preliminary Analysis

Professional Endorsement & Reporting



1 day vs. 3 days  
RaSpect Traditional

2 days vs. 5 days  
RaSpect Traditional

7 days vs. 20 days  
RaSpect Traditional

**+67%**

**+60%**

**+65%**

\*Schedule for a typical building of 20 storeys

Step 1

Step 2

Step 3

Step 4

# Autonomous Data Capture

Curtain Wall Building



▲ Close Up Inspection



▲ General Inspection

Reinforced Concrete Building



▲ General Inspection

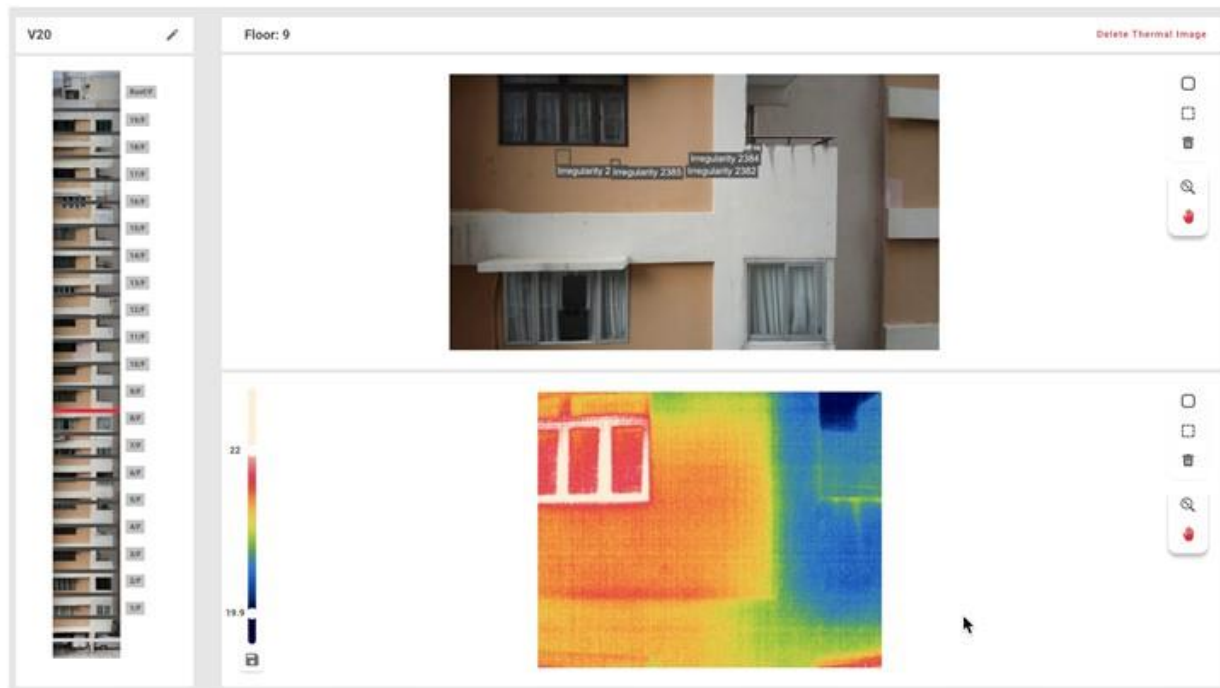


▲ Preliminary Inspection



# 1A. Drone based – Aerial Data Collection (Visual & Thermal)

Systematic high definition visual and thermal survey of designated roof, cladding, curtain wall and high ceiling area supplemented with high resolution still photos for identified problem areas. Includes careful flight path documentation of all areas scanned for clear identification when post processing.



▲ (Ref. Case) Data collection, localisation and defects finding by using AI-Powered Analysis Algorithm

# 1B. Mobile App based - Handy Data Collection (Visual only)



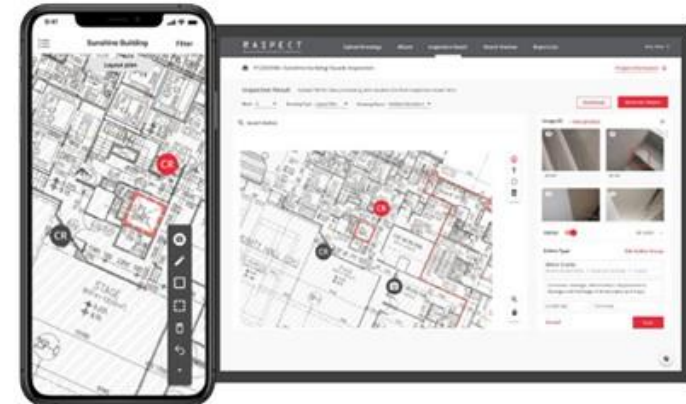
Login



Project list



Select Drawing





# 1C. Robot based - Data Collection (Visual and Thermal)

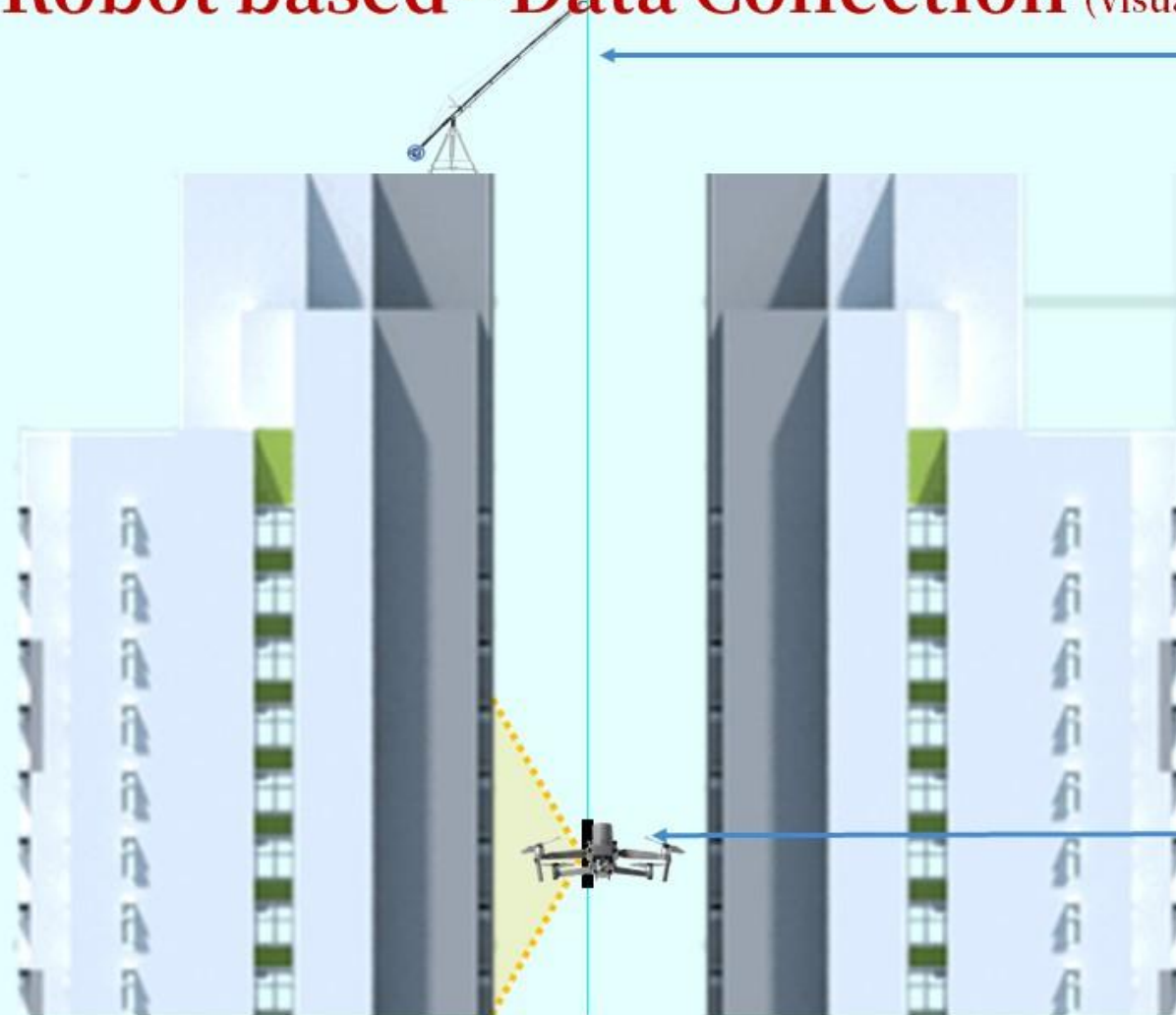
Hardware Technology

## Guiding System

- Cable jib system
- Suspend wire-ropes towards the ground
- Secured on the roof for additional safety

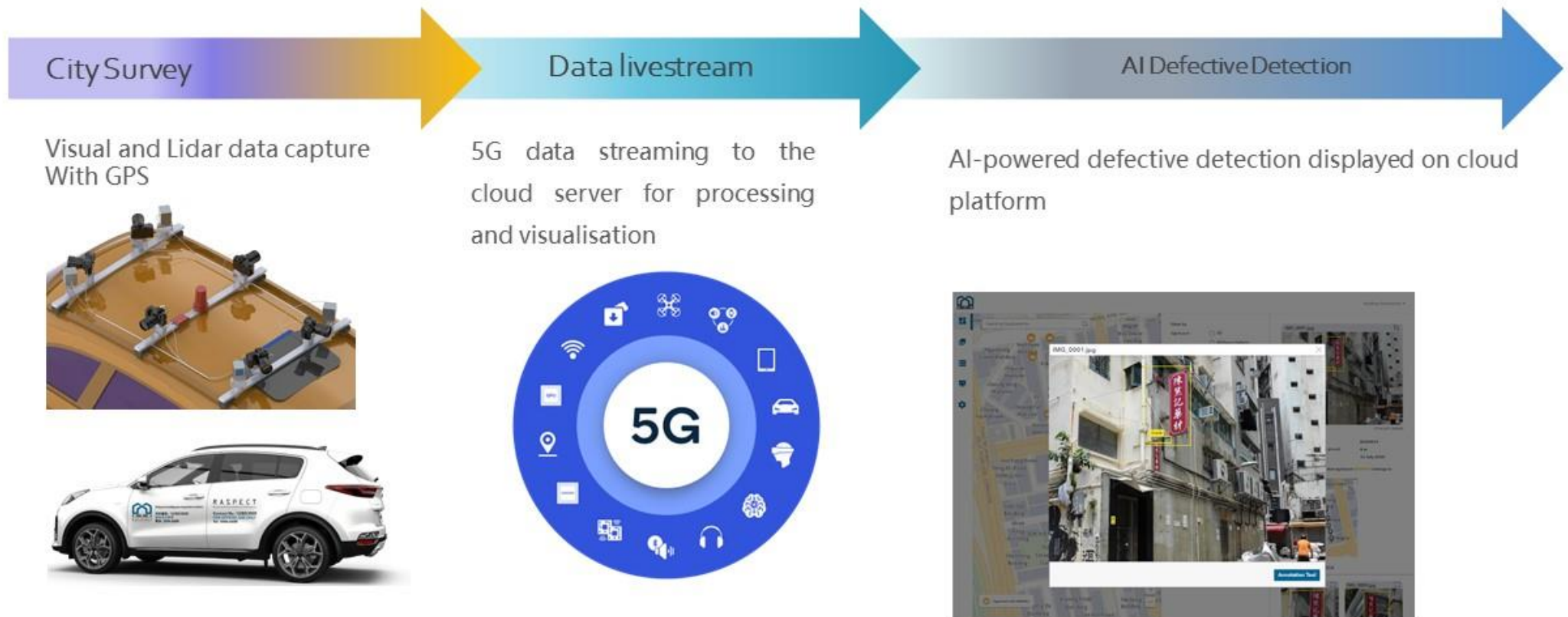
## UAS (Drone)

- Equipped with infrared and visual camera
- Protected by propeller guard
- Can equip lighting for illumination





# 1D. Vehicle based – City level Data Collection (Visual and LiDAR)





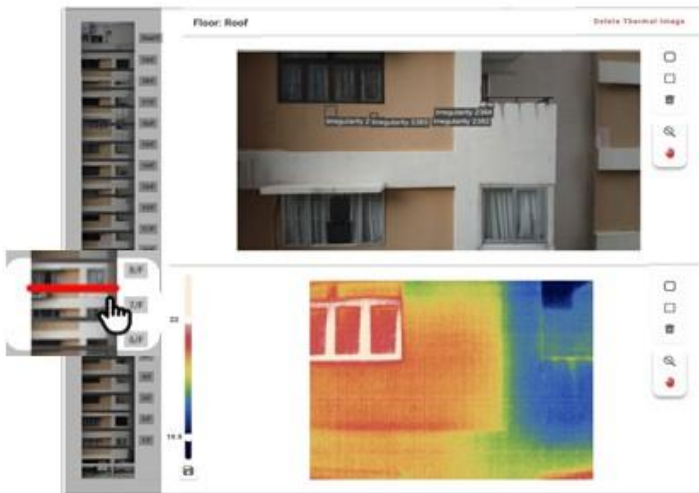
Step 1

Step 2

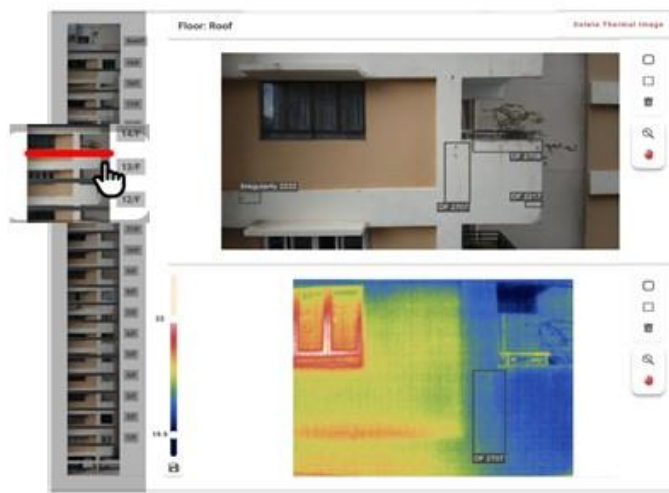
Step 3

Step 4

## Data Upload & AI Data Localization



▲ Lower Floor



▲ Middle Floor



▲ Upper Floor

Step 1

Step 2

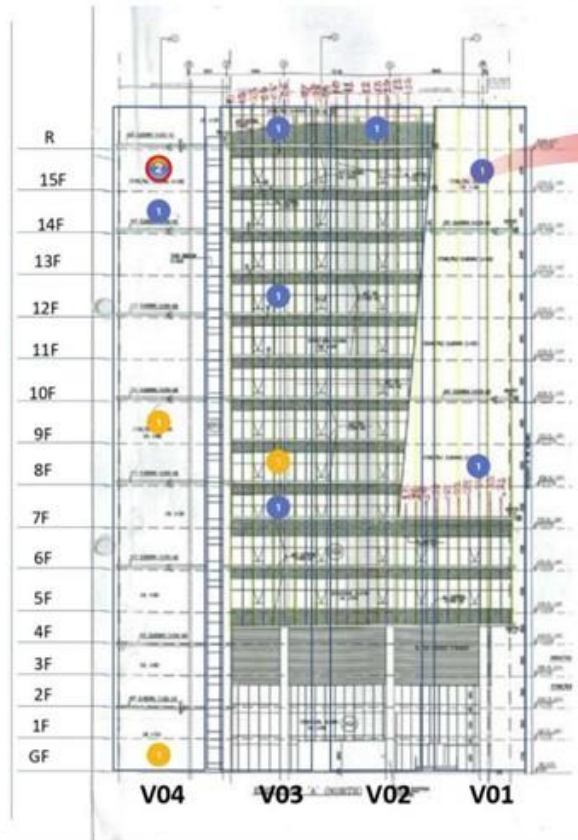
Step 3

Step 4

## AI Preliminary Analysis

### Defect Severity

- Critical
- Major
- Moderate
- Minor
- Cosmetic
- Major + lower severity



▲ Auto-suggested Defect Tagging



▲ AI Defect Analysis



▲ Automatic Privacy Filter



Step 1

Step 2

Step 3

Step 4

## Professional Endorsement & Reporting

Severity Level	Action
Critical Defect	Take action immediately
Major Defect	Take action as soon as possible
Moderate Defect	Take action when possible
Minor Defect	Monitor regularly
Cosmetic Issue	Keep under watch

▲ Severity Level Assessment Guidelines

The screenshot displays the RaSpec software interface. At the top, there's a navigation bar with options: 'Upload Drawings', 'Inspection Result', 'Result Preview' (highlighted), and 'Report List'. Below this, the project name 'KEFF 202102-Keep Ming House' is shown. The main content area is titled 'Result Preview' and features a 'DEFECT FILTER' and a 'Close Filter' button. A large 3D/2D model of a building facade is shown with several yellow and red markers indicating defects. On the right side, there's a list of defects with details like 'Defect ID: DF-0038', 'Vertical v1', and 'Severity: None'. A 'Generate Report' button is located in the top right corner of the interface.

▲ Result Preview (3D/2D)

# Scope of Service - Report Format

## Results and Findings

**RaSpec** RaSpec Intelligence Inspection Limited



**Sample Facade Inspection Report**

Prepared by:  
RaSpec Intelligence Inspection Limited  
Date of Issue:  
30 April 2022

Project No. RA0220001

Approved by:  
RaSpec Intelligence Inspection Limited  
Date of Issue:  
30 April 2022

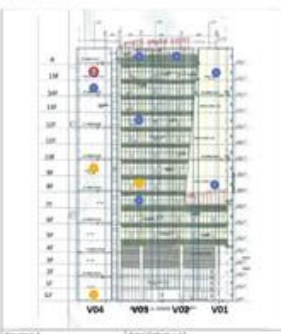
Approved by:  
RaSpec Intelligence Inspection Limited  
Date of Issue:  
30 April 2022

**RaSpec** RaSpec Intelligence Inspection Limited

**Defect Severity**

- Minor
- Major
- Critical
- Structural
- Other
- Not Inspected

Crack on Elevation A:



V04 V05 V06 V07

**RaSpec** RaSpec Intelligence Inspection Limited

**Appendix B**

**Defect List - Image-based**

**Defect List - Visual only**

Location	Defects	Defect Type	Floor	Severity	Approximate Area (sqm)	Reviewer Comment	Follow-up Action
Elevation A, V04	DF 2621	Crack	15	Major	115.7421W -54268	N/A	Repair
Elevation A, V04	DF 2622	Crack	15	Major	432.527W -227664	N/A	Repair



**RaSpec** RaSpec Intelligence Inspection Limited

**Appendix A**

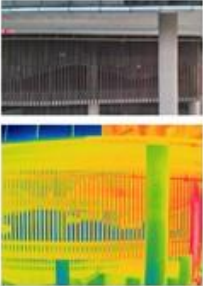
**Defect List - Defect-based**

#	Defect ID	Elevation	Floor	Dimension (mm)	Severity	Reviewer Comment	Follow-up Action	Defect Images
1	DF2621	Elevation A, V04	15	Length: 115mm Width: 400mm	Major	N/A	Repair	
2	DF1910	Elevation A, V04	8	Length: 200mm Width: 200mm	Moderate	N/A	Repair	
3	DF2622	Elevation A, V04	15	Length: 432mm Width: 58mm	Moderate	N/A	Repair	
4	DF2627	Elevation A, V03	8/9	Length: 220mm Width: 332mm	Moderate	N/A	Repair	
5	DF2632	Elevation A, V04	15	Length: 432mm Width: 527mm	Minor	N/A	Repair	
6	DF2627	Elevation A, V04	14	Length: 120mm Width: 61mm	Minor	N/A	None	
7	DF2622	Elevation A, V03	8/9	Length: 280mm Width: 431mm	Minor	N/A	Repair	
8	DF2625	Elevation A, V03	12/9	Length: 717mm Width: 514mm	Minor	N/A	Repair	

**RaSpec** RaSpec Intelligence Inspection Limited

**Defect List - Visual and Thermal**

Location	Defects	Defect Type	Floor	Severity	Approximate Area (sqm)	Reviewer Comment	Follow-up Action
Elevation A, V01	DF2628	Stain	8	Minor	460.74257W +208390	N/A	Other (Cleaning and paint)
Elevation A, V01	DF2633	Hot Anomaly	8	Minor	158.730W +92362	N/A	None

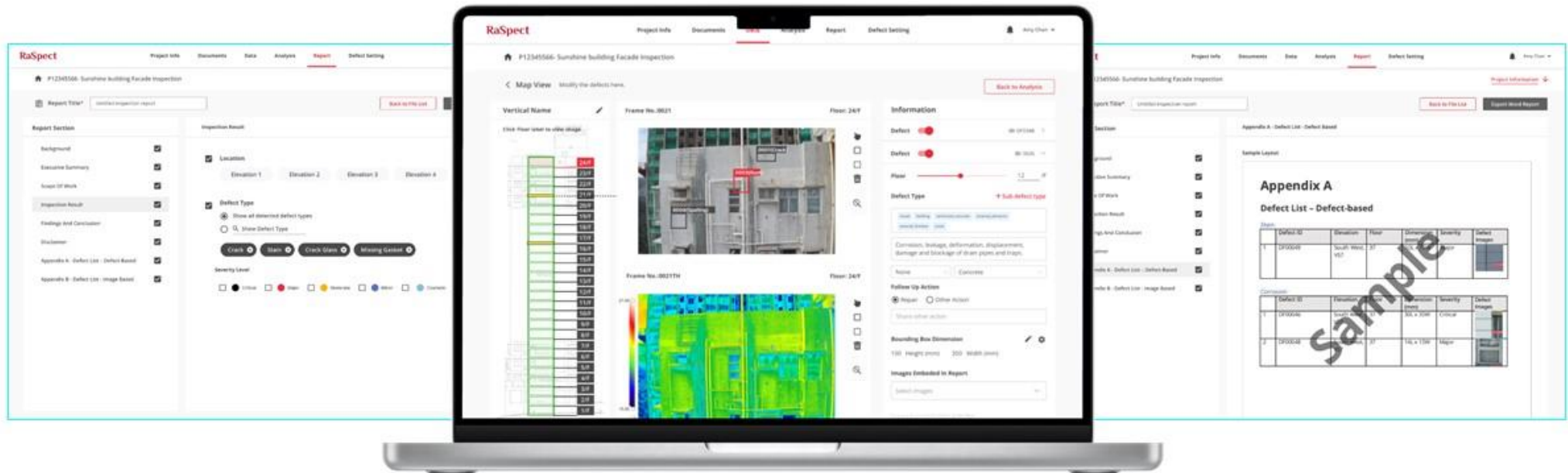


▲ (Ref. Case) Sample Report Format



# Scope of Service - Report Visualisation

Presents all inspection analysis on Inspectica™ platform



▲ (Ref. Case) Sample Screenshots in Inspectica™ Platform

[Layout Plan](#)

[Floor Plan](#)

[Elevation](#)

[Other Drawings](#)

[Other Documents](#)



f6019ad6-4278-4fc4-8890-17535c4fec0a  
13 Jun 2022 at 3:08 PM



Add new file



# 100+ Customers

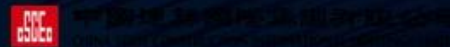
## Property Owners & Real Estate Developers



## Facility Managers



## Consultants/Registered Engineers/Building Surveyors



## Governments



## Signature Works

200+  
Buildings Inspected

10,000+  
Flight Trips

3+ Million  
Images



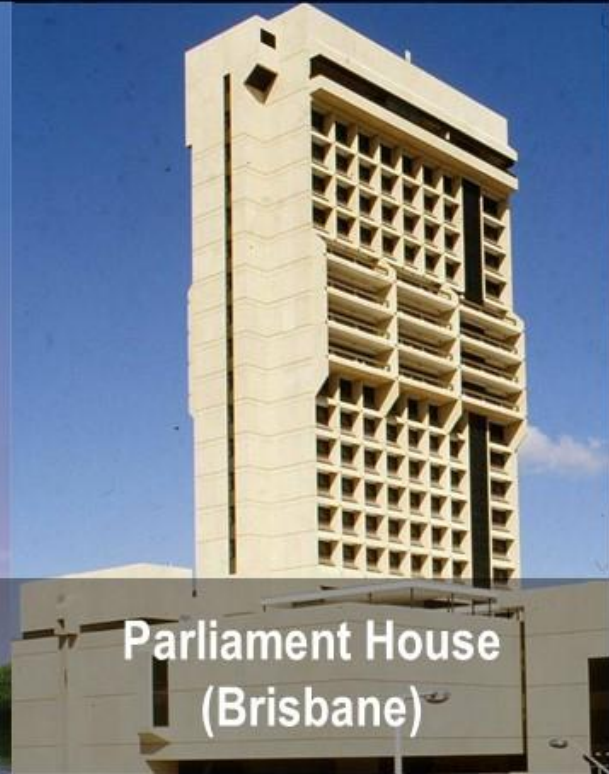
ICC  
(Hong Kong)



Bank of China  
(Hong Kong)



IT Lagoon Building  
(India)



Parliament House  
(Brisbane)



# Customer Testimonials



“...I use RaSpect Inspectica™, an all-in-one platform that I find highly convenient and user-friendly.”

**Dominic Chau**

Cove Vision Surveys Limited  
Registered Professional Surveyor



“...defects can be addressed early on, facilitating prompt maintenance arrangements and reducing the risk of potential hazards.”

**Jeff Ng**

Kai Shing Management Services Limited  
Senior Technical Services Manager



“...we minimize greatly our interference to residents and tenants. In addition, we can utilize drone technology to inspect the structural integrity of our buildings.”

**Simon Baxter**

Great Eagle Holdings Limited  
Managing Director, Development & Project Management



“...the system also automates paperwork processes and streamlines regulatory workflows.”

**WONG Yue Ka, Edgar**

Buildings Department Structural  
Engineer (Signboard Control 8)

# Awards & Certifications



Forbes Asia 100 to Watch (2021)



Tech Top 50 Industrial Engineering Award by Valuer AI (2022)



Silver Award of Global AI Challenge Competition for Building Cooling Load Prediction (2022)



The Most Inspiring AI CEOs to Watch (2020)



KPMG China Leading PropTech 50 (2022)



Winner of Hong Kong ICT Startup Gold Awards (2020)



Winner of World Summit Awards Smart Settlements & Urbanization (2019)



Red Herring Winner Asia Top 100 (2019)



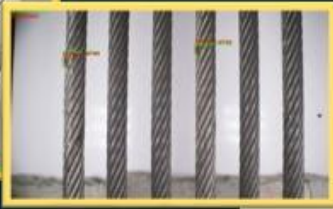
Winner of Hong Kong Rising Star Deloitte China Rising Star Program (2019)



Gold Medal Award Winner of 2nd Asia Exhibition of Inventions Hong Kong (2019)



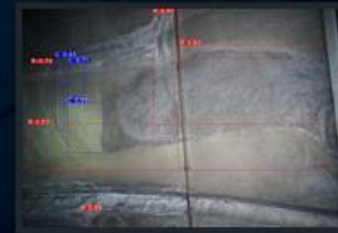
# AI Inspection Technology



Elevator / Escalator Functional Safety Monitoring



Smart Building Platform



Tunnel Inspection



Pylon Tower / Radio Station Inspection



AI Façade & Piping Inspection



AI-Signboard Defect Detection



Pump/Chiller Bearing Monitoring



Heritage Inspection



Road Image Capturing

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## Website

