Bringing AI into Virtual Inspection

Virtual capture is the evidence layer.
AI turns it into inspection decisions.

Turning 360 & LiDAR scans into compliance-ready checks

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What participants will learn

A 30-minute technical path from scans to reviewable inspection outputs.

01

How AI adds value
What changes when 360 and LiDAR data become measurable, searchable and checkable.

02

What sensors are supported
Sensor types, capture SOPs, detection / measurement pipeline and feasibility results.

03

How the workflow operates
From capture upload to AI extraction, rule checks, dashboard review and report generation.

04

How to adopt it safely
SOPs, confidence thresholds, human review, audit trail and practical scale-up.

Outcome: know what to capture, what AI can check, and what still needs professional judgement.

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The shift: from virtual record to virtual inspection

Scans become useful when they are tied to objects, dimensions, clauses and evidence.

01

Detect
Find inspection-relevant elements: WC, basin, grab bars, doors, stairs, landings and headroom.

02

Measure
Extract points, planes, centerlines and distances from reconstructed geometry.

03

Check
Run deterministic rule checks against TOP/accessibility requirements and tolerances.

04

Review
Package evidence, exceptions and confidence flags for human assessment.

The value is not the scan itself. It is the repeatable, auditable inspection decision that can be traced back to the scan.

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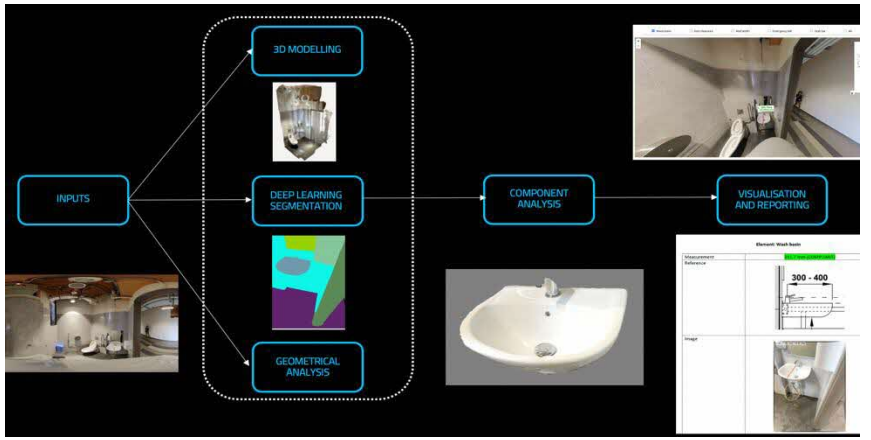
Project foundation: Accessible Water Closets (WC) & Staircases

The masterclass is anchored on the original scope: virtual scans → AI extraction → compliance checks.

Scope

Automatically detect and measure key TOP objects from virtual 360 scans.
Apply rule-based logic to identify potential non-compliance.



Staircase

Step geometry · landing · headroom

Accessible toilet

Water closet · doors · emergency bells · grab bars · accessories · signage

Adoption ambition

A repeatable virtual inspection workflow that goes beyond image recognition.

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What did H3 Zoom set out to validate

Prototype, measurement feasibility, software reviewability and SOPs for virtual TOP scan analysis.

01 **Prototype** Integrate 360, LiDAR or mixed captures into a backend system.

02 **AI model target** Minimum 80% success rate for detecting the 9 TOP objects in scope.

03 **Measurement logic** Evaluate feasibility against accepted physical measurement tolerances.

04 **Software output** Customized UI and automatically generated non-compliance report.

05 **Capture SOP** Best-practice guide to improve data quality and repeatability.

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Capture best practices for TOP-readiness scans

AI performance starts with disciplined capture — not with the model.

01

Coverage
Capture full context: floor, walls, fixtures, upper and lower elements.

02

Overlap
Maintain 70–80% overlap for photogrammetry and stable reconstruction.

03

Passes
Scan at eye level, lower level and upward angle to capture hidden areas.

04

Visibility
Avoid occlusions; keep key elements and accessories in view.

05

Quality
Avoid blur, glare, reflective surfaces and strong shadows where possible.

06

Review
Check before leaving site: missing, noisy, blurred or hidden areas.

Masterclass principle: standardise capture first, then standardise AI checks.

Two AI patterns in the study

Accessible toilets and staircases require different reasoning strategies.

Accessible toilets
Object-centric checks

Detect fixtures and accessories.
Build local reference frames.
Measure distances from planes, centerlines and keypoints.
Evaluate against TOP/accessibility clauses and tolerances.

Staircases
Geometry-centric checks

Extract stair planes and slice axes.
Reconstruct tread and riser polylines.
Check uniformity across sequential measurements.
Assess landings, widths and headroom.

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Where measurement errors come from

Understanding failure modes is how teams move from demo to deployable workflow.

01

Textureless surfaces

White walls and low-feature areas reduce reconstruction texture.

02

Reflective objects

Grab bars, taps and metallic fittings can distort geometry.

03

Flat wall-mounted items

Thin objects need enough viewpoints and masking.

04

Hidden clearances

Toe clearance and obstructed spaces require lower capture passes.

Mitigation: reduce reflectiveness, add texture markers, tune floor planes, add image masking, and define human-review thresholds.

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How teams can adopt AI-enabled virtual inspection

Start with narrow clauses, validated payloads and human review before scaling portfolio-wide.

01

Define use case
TOP readiness, QA/QC, accessibility audit or defect close-out.

02

Select payload
Pick camera/device based on geometry, accuracy and site constraints.

03

Lock SOP
Standardise coverage, overlap, lighting, markers and review-before-leaving-site.

04

Validate rules
Compare measured outputs against manual references and accepted tolerances.

05

Human review
Review low-confidence checks and flagged exceptions.

06

Scale integration
Connect outputs to dashboards, DEX, PDF reports, CMMS or QA systems.

Recommended first pilot: one building type, one validated payload, one clause family, one dashboard workflow.

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Use cases beyond the BCA study

The same scan-to-check architecture can support broader built-environment workflows.

TOP readiness
Pre-submission checks and exception reviews before formal inspection.

QA/QC close-out
Compare construction progress and workmanship against defined checklists.

Accessibility audit
Portfolio-wide detection of access barriers in public or private assets.

Facilities management
Turn observations into work orders, maintenance cycles and trend dashboards.

Valuation & risk
Create condition evidence that supports due diligence and asset prioritisation.

Digital handover
Convert capture and inspection outputs into structured records for owners.

Strategic value: use capture as a feed for compliance, QA, asset-risk and operational workflows.

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What should remain human-reviewed

AI should automate extraction and triage, while keeping judgement, accountability and exceptions auditable.

01

Confidence thresholds
Flag low-confidence detections and measurements for review.

02

Tolerance bands
Separate clear pass/fail cases from borderline measurements.

03

Audit trail
Preserve raw evidence, measurement anchor points, rule version and reviewer actions.

04

Professional judgement
Escalate ambiguous site conditions, obstruction, poor capture or safety-critical exceptions.

Deployment rule: automate the repeatable checks; preserve professional judgement for exceptions.

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What participants should leave with

Four clear implications for adopting AI in virtual inspection.

01 AI unlocks value only after scans are structured into objects, measurements and rule checks.

02 Capture discipline matters: SOP, overlap, lighting, visibility and markers directly affect accuracy.

03 Accessible toilets and staircases need different technical approaches.

04 Outputs must be reviewable, auditable and exportable — not a black box.

Q&A

Thank You

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