CHCNAV

Daegu Station Escalator BIM

Simulation with CHCNAV RS10 High-Precision Scanning

Client's name

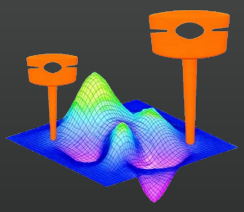
DAEGYEONG Survey System

Products and Solutions

CHCNAV RS10, Insta360, CHCNAV CoPre, Autodesk Revit

CHCNAV RS10

Insta360



CHCNAV CoPre

Autodesk Revit

Key Highlights

Direct RCP Output

CoPre supports SLAM data processing and direct export in RCP format. The point cloud can be imported directly into Autodesk Revit without additional conversion through ReCap or the need for CAD drawings, helping reduce software costs and simplify the BIM workflow.

High Efficiency

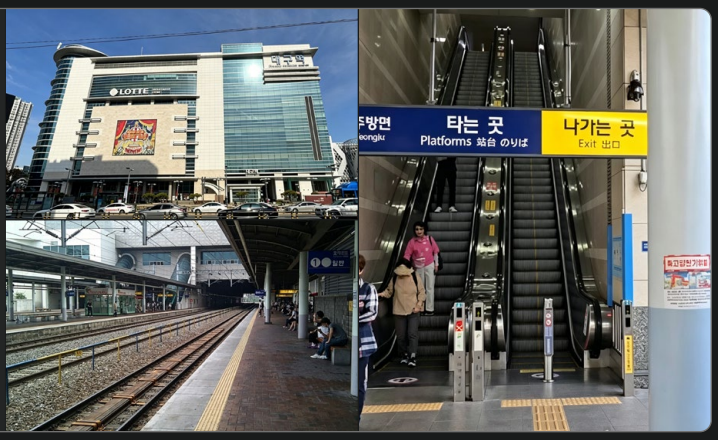
One operator completed full-site data acquisition in 30 min, reducing field time while minimizing disruption to station operations.

High Accuracy

The deep integration of RTK and SLAM enables high-precision point cloud capture, even without ground control points.

Project Overview and Requirements

This project was carried out at Daegu Station on the Gyeongbu Line in South Korea. The main objective was to build a BIM model to simulate the construction of new escalators at the station. The project required accurate digital reconstruction of the station environment to assess the transportation and installation of escalator trusses within a confined and operational railway space.



The Value of Simulation

The project team created 3D models of the escalators, station structure, construction equipment, and surrounding environment. By simulating the full disassembly, relocation, lifting, and installation process before construction, the team could identify potential collisions, congestion, clearance issues, and schedule conflicts in advance.

One-person operation
reduces field labor and time costs.

High-precision point clouds
improve construction accuracy.

Rapid review of on-site changes
helps reduce trial-and-error during construction planning.

Digital analysis
reduces communication costs between stakeholders.

Introduction of the CHCNAV RS10

https://geospatial.chcnav.com/products/chcnav-RS10

Core Technology

RTK + LiDAR +
SLAM deep fusion

Stability

The 4th-generation air dielectric GNSS antenna provides reliable RTK positioning accuracy in complex outdoor environments.

Scan Range

120 m (16 lines); 300 m (32 lines)

Accuracy Performance

Absolute accuracy H < 3 cm, V < 3 cm
Relative accuracy< 1 cm

Raw Point Cloud Formats

RCP, E57, LAS, LAZ, PTS

Why Choose RS10 Instead of Terrestrial Laser Scanner (TLS) or Total Station

 Product	 Data Acquisition	 Data Processing	 Features
RS10 (16 lines/ 32 lines)	• Data can be collected while walking, with full-site acquisition completed in 30 min. • No tripod, limited surveying experience, and no GCPs are required. • Real-time feedback helps confirm data completeness on site.	Direct RCP point cloud output, panoramic photos, and processing completed in about 1 hour.	Simple workflow, high efficiency, and strong visualization for BIM and construction simulation.
TLS	• In crowded station environments, the platform may need to be partially closed. • Complex structures require multiple scan positions, and field acquisition can take 5 to 10 hours. • Targets are also required for registration.	Multiple scans must be registered. Large datasets require high computer specifications and long processing times, often more than one day.	Accurate but less efficient, more complex, higher cost, and higher operational requirements.
Total Station	• Complex structures require multiple setup locations, and acquisition can take 5 to 10 hours. • Surveyor point selection has a direct impact on modeling quality. • Curved or complex surfaces cannot be fully represented.	Produces discrete points only. No surface information is available, so manual interpreta-tion is required.	High accuracy, but low efficiency, no visual context, and better suited to simple measurement scenarios.

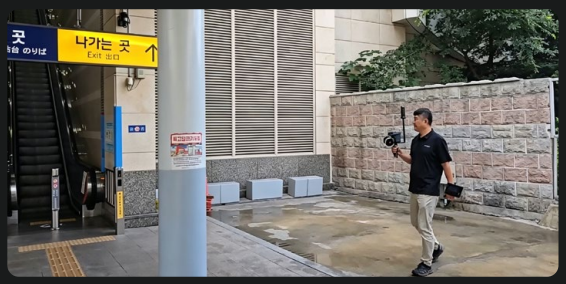
Workflow

Step 1

Confirm the scanning area and route to ensure complete coverage of escalators, station structures, construction equipment access paths, and surrounding elements.

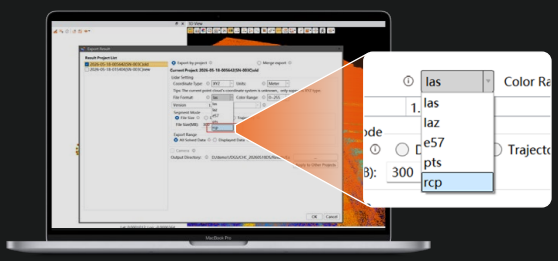
Step 2

Use the RS10 to collect point cloud data in the field.



Step 3

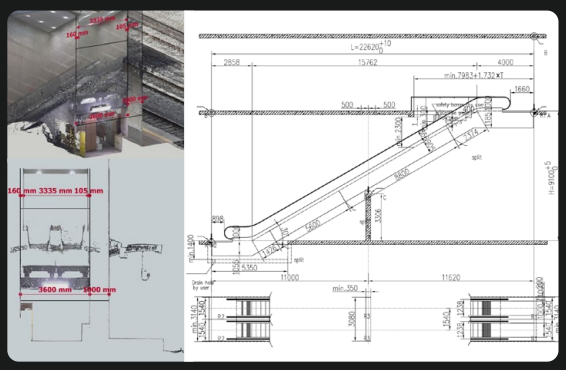
Process raw data in CoPre and export the point cloud directly in RCP format.



Step 4

Import the point cloud directly into Autodesk Revit for slicing and measurement. Use the point cloud to obtain accurate elevations and section dimensions.

Escalator width: 3335 mm
Channel width: 3600 mm
Structural column width: 1000 mm
Left side panel spacing: 160 mm
Right side panel spacing: 105 mm



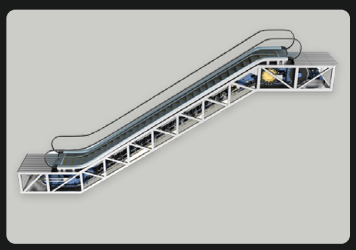
Step 5

Generate the BIM model in Revit based on the point cloud data, following a scan-to-BIM workflow.

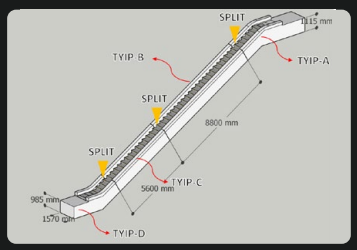
Step 6

Perform analysis and construction simulation based on the point cloud and BIM model, then submit the final deliverables.

Truss Partitioning Plan



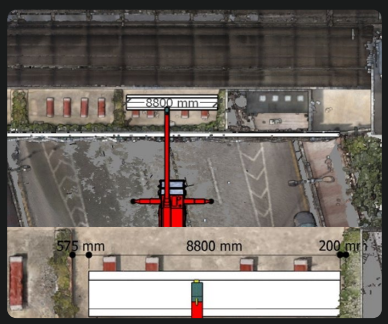
Truss Structure Diagram

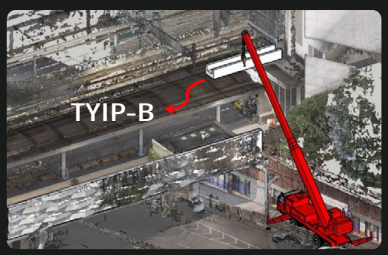


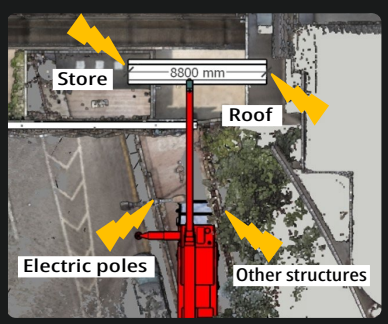
Partitioning Plan

Alignment and Comparison of the Model and Point Cloud

Crane Site Selection Simulation and Verification

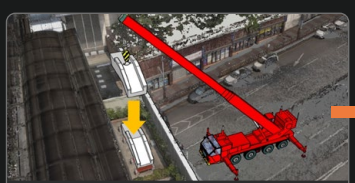




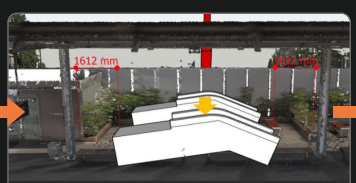


Lifting and Construction Simulation

The trusses were transported and lifted in the following order: Type A → Type B → Type C → Type D

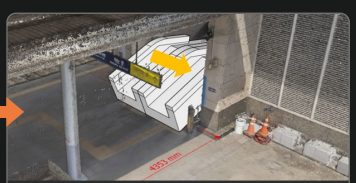


Horizontal projection: Position the truss in the appropriate location



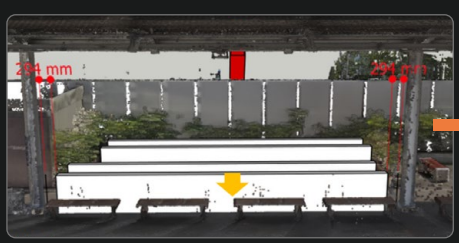
Approximately 3,200 millimeters between columns

Move the truss to the entrance of the escalator

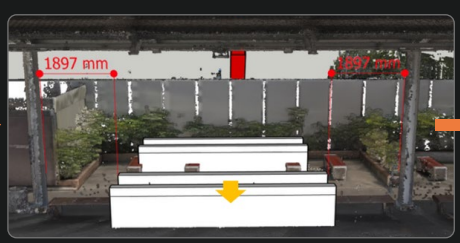


The channel is narrow, so the truss must be moved parallel to the entrance

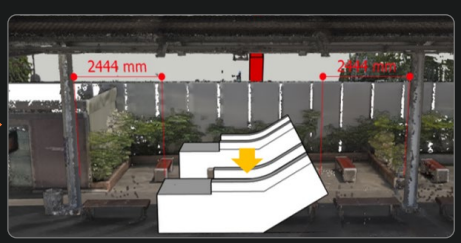
The lifting and construction method for Type B, Type C, and Type D followed the same validated procedure.



TYPE B



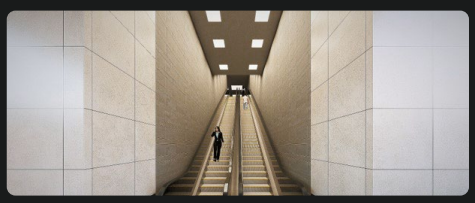
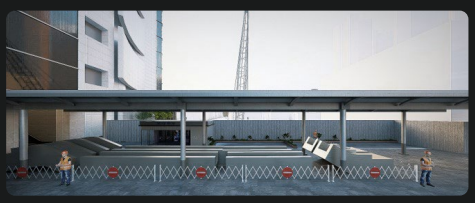
TYPE C



TYPE D

BIM Model Presentation




The final BIM model presented the station, escalator installation area, lifting equipment, surrounding structures, and construction sequence. The model provided stakeholders with a clear visual reference for reviewing the proposed construction process and understanding potential site constraints before execution.

Customer Feedback

CHCNAV RS10 High-Precision Scanning

★ ★ ★ ★ ★

For this project, the CHCNAV RS10 provided excellent efficiency and convenience. We did not need to close the station platform for survey work, and full-site data acquisition was completed in just 30 min. With minimal processing, we obtained high-precision point cloud data in RCP format without additional data conversion software or data stitching. This efficient and straightforward workflow is well suited for construction simulation and project presentation.

About our Partner

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DKSYSTEM is a geospatial solutions company and the official distributor of CHCNAV in Korea. The company specializes in surveying equipment sales and rental, as well as spatial data acquisition and processing services.

DKSYSTEM은 CHCNAV 한국 총판으로 측량장비 판매·임대부터 공간정보 데이터 취득 및 처리까지 제공하는 공간정보 전문기업입니다.

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