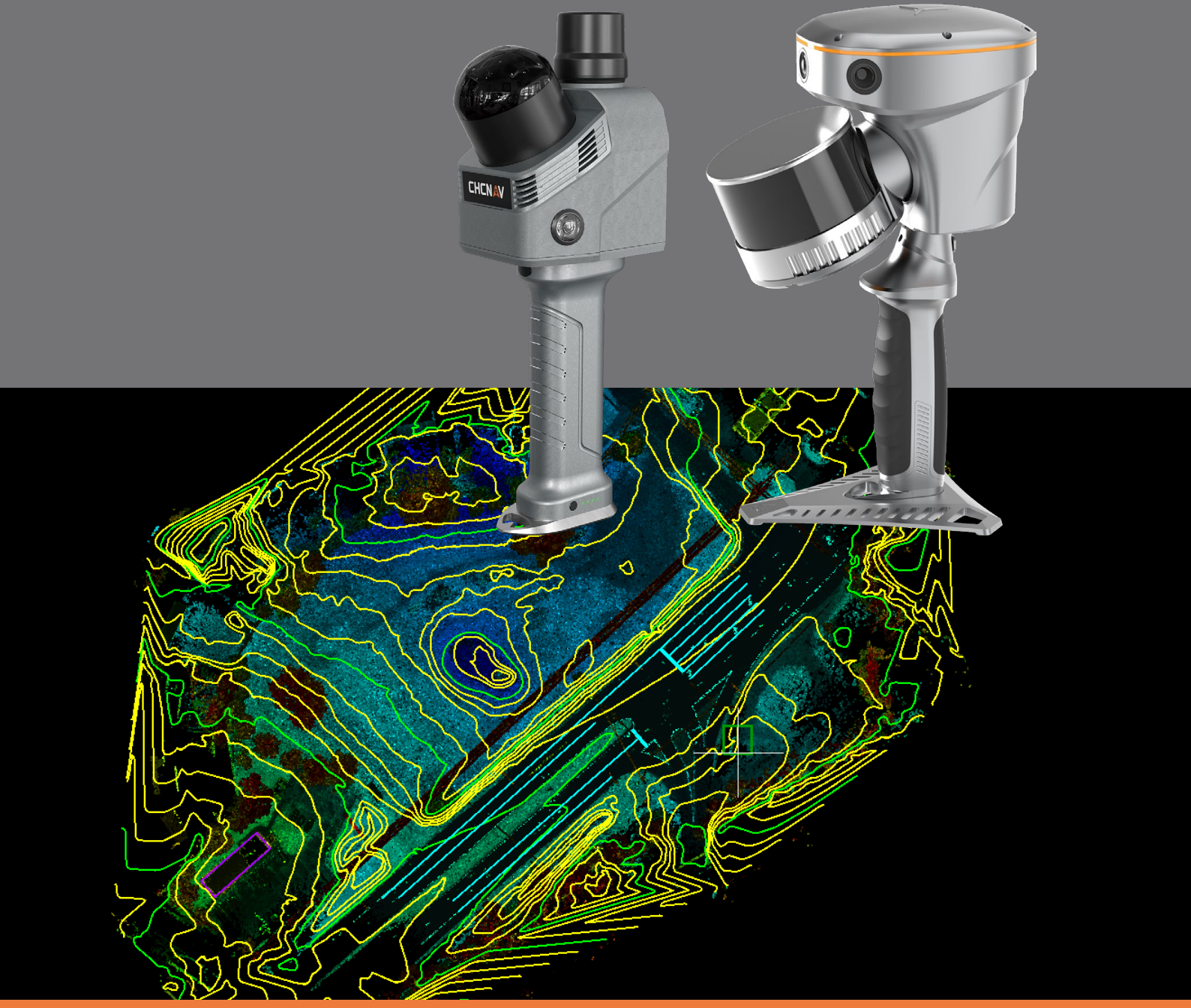
CHCNAV

Streamlined & Intuitive

One-Stop Topographic Mapping with RS Series



SLAM and CoProcess

Client's name

iGage Mapping Corporation

Products and Solutions

Products and Solutions: 60,000 sqm topographic mapping project, requiring contours and precise line drawings in Lexington, USA with CHCNAV RS series scanner.

Achievements / Highlights

High Efficiency
From field scanning to final mapping in just one day—5x faster than traditional GNSS receiver solutions.

No-Fly Zone Ready
No drones needed; collect data normally even in restricted areas.

Simple Software
Extremely easy to use CoProcess with minimal training required

CHCNAV Ecosystem Advantage
Seamless integration of CHCNAV GNSS and RS10 workflows for a one-stop solution

1. Project Overview

Professional surveyors today face a critical dilemma.

Traditional RTK GNSS measurements are accurate but prohibitively slow for large-scale sites, often requiring days of tedious point-by-point labor.

UAV (Drone) mapping is frequently hampered by **"No-Fly Zones,"** dense vegetation, or the inability to capture ground data under tree canopies.

Matthew Sibole, a licensed land surveyor in Kentucky working with iGage, carried out a topographic survey of a 60,000 m^2 (14.8-acre) site in Lexington, Kentucky. The client needed a solution that could overcome these limitations while still delivering survey-grade accuracy within 24 hours.

CHCNAV RS10 + SmartGo + CoPre + CoProcess

By deploying the CHCNAV RS10 SLAM scanner and the CHCNAV software ecosystem(Smartgo, Copre. Coprocess), the field data collection was completed in just 30 minutes. This "one-stop" workflow seamlessly transformed raw point clouds into precise DEMs, smooth contours, and CAD-ready linework (.dwg/.dxf), delivering professional results without the need for third-party format conversions.

Project Requirements

Professional deliverables meeting accuracy requirements

Vector line drawings (including buildings, roads, vegetation, manholes, etc.), contour lines (1 us-ft intervals), and elevation grids—all with measurement accuracy within 1 us-ft.

Surveying in No-Fly Zones

Data collection conducted in restricted "No-Fly Zones" where aerial surveys (drones) are strictly prohibited.

Tight project schedule

2. Introduction of RS10&RS7 handheld scanner

RS 10 Combines a 4th-generation air dielectric GNSS antenna with LiDAR and SLAM to deliver RTK-level positioning in complex outdoor environment

RS 7 by contrast, uses Deep INS and SLAM fusion to maintain stable performance in indoor and feature-poor.

 RS 10	Feature	 RS 7
RTK + LiDAR + SLAM deep fusion	Core Technology	High precision INS + SLAM deep fusion
120m(16 lines); 300m(32 lines)	Scan Range	40m @ 10% Reflectivity
Absolute accuracy H < 3cm, V < 3cm; Relative accuracy < 1cm	Accuracy Performance	Absolute accuracy H < 3cm, V < 3cm; Relative accuracy < 1cm
Featuring a 4th generation air dielectric GNSS antenna, it provides RTK positioning accuracy in complex outdoor environments	Stability	**INS zero drift ≤ 0.5%/h; handles feature sparse environments**
Outdoor open areas, forest zones, projects requiring absolute georeferencing	Applicable Scenarios	Indoor, underground, long corridors, multi floor staircases, high detail modeling

Why Choose RS10 Over Traditional RTK or UAV?

Beyond RTK

While a standard GNSS receiver unit captures one point at a time, the RS10 captures millions of points per second while you walk. It increases field efficiency by over 1,000% without sacrificing the precision of a fixed solution.

Beyond UAV

The RS10 operates where drones cannot. Whether it's a "No-Fly Zone," a dense forest, or an urban canyon with obstructed GNSS signals, the RS10's SLAM engine ensures continuous, high-accuracy data acquisition.

Feature	 GNSS receiver	 UAV LiDAR	 SLAM Scanner (RS10 + CoProcess)
Data Acquisition (Field)	Slow (Point-by-point manual collection) 5 hours Missing areas in indoors and occluded zones	Fast (Aerial coverage at flying speed) 20 mins	Fast (Rapid scanning at walking speed) 20 mins
Data Processing (Office)	5 hours	50 mins data-optimization +CoProcess one-stop drawing	50 mins data-optimization(fast coloring)+CoProcess one-stop drawing
Operational Environment	Open sky only (Requires clear GNSS signal)	Open sky; restricted by "No-Fly Zones"	Indoor, Outdoor, Under Canopy, and Urban Canyons
Positional Accuracy	Highest (Centimeter-level absolute)	Moderate to High (Depends on flight altitude)	High (Centimeter-level with RTK-constrained SLAM)
Relative Cost	$	$$$$	$$

Beyond other SLAM

CHCNAV Ecosystem, APIS Technology, Native HCN Static Data Support:

The RS10 redefines productivity through CHCNAV's proprietary **APIS technology**, creating a truly seamless "Field-to-Finish" experience. By simply entering the Serial Number (SN) of a CHCNAV GNSS receiver into the SmartGo software, users can obtain an instant FIX status, enabling automated, high-precision coordinate transformation of the point cloud without manual intervention.

For projects requiring **PPK post-processing,** the advantage is even clearer:

our ecosystem allows for the direct selection of native **.HCN static data** from CHCNAV base stations. This removes the friction of converting files to third-party RINEX formats and eliminates the risk of human error associated with manually entering antenna heights and pole offsets.

The CoProcess Advantage

The One-Stop, Worry-Free Surveying Suite

CoProcess is an all-in-one platform featuring professional tools for automated classification, terrain generation, volume calculation, and drafting—**without the add-on module fees often associated with third-party software.** Its familiar CAD-style interface ensures your team can produce high-quality topographic deliverables immediately, with minimum training requirement.


Automated Classification


Terrain Generation


Volume Calculation


Drafting

Feature	Mainstream Third-Party Software	CHCNAV CoProcess
Functionality	Modular (each feature costs extra)	All-in-One (fully integrated)
Pricing Model	Annual Subscription / Recurring fees	One-time Purchase; Perpetual License
Update Costs	Ongoing annual "Maintenance" fees	Lifetime Updates included for free
Learning Curve	High; requires specialized training	Easy; Intuitive CAD-style interface
Cost Predictability	Hidden costs for updates and modules	Fixed investment; No hidden expenses

3. Workflow – Data Acquisition to Final Topographic Map

The workflow is divided into three stages: field acquisition, data optimization, and in office drawing, followed by final deliverable generation.

Step A : Field Acquisition

Base station setup / CORS use

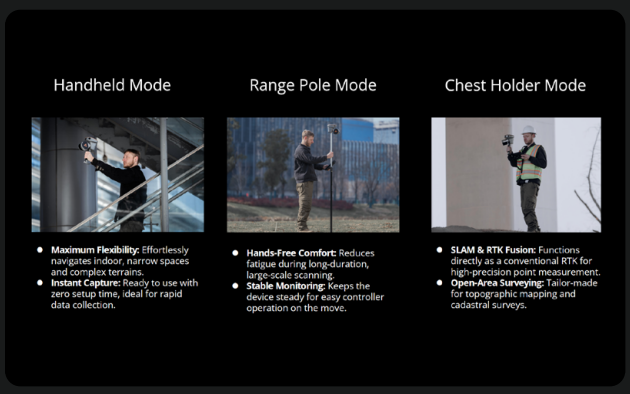
A base station was set up over a known point, or a local CORS service was used for real time corrections.

Device connection via SmartGo

The RS10 was connected to the SmartGo mobile app.

Scanning

With RTK fixed confidence, the operator walked the entire 60,000m² site. The RS10's RTK+SLAM deep fusion ensured absolute accuracy without requiring loop closures.



Multiple Operation Modes

Allow users to choose the most suitable workflow for different project scenarios, improving operational efficiency.

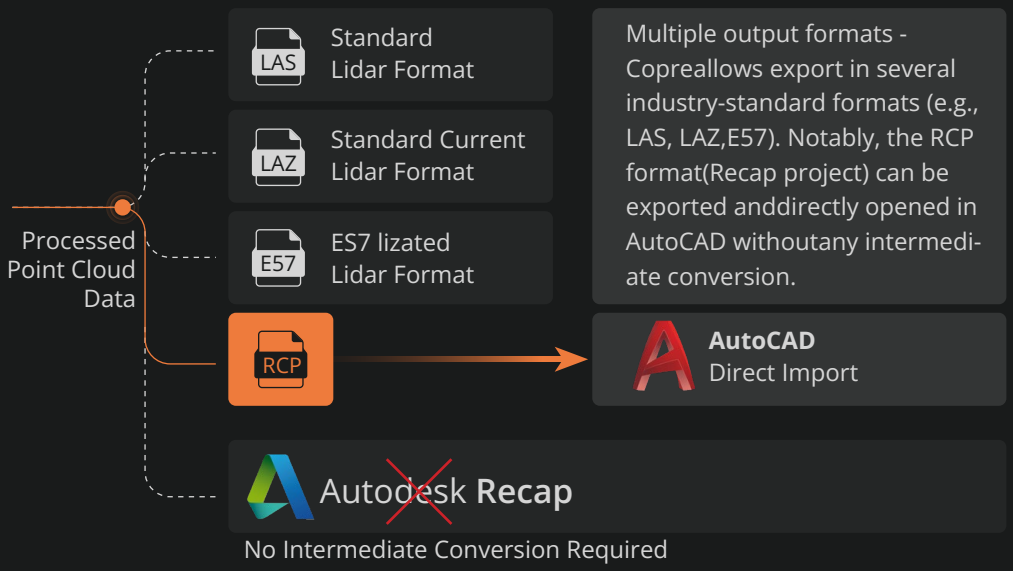
Step B：Data Optimization (Post-Processing)

One-click data processing with CoPre

After the field scan, raw data was imported into CoPre software. A single click performed full SLAM post-processing, generating a cleaned, optimized point cloud.

Multiple output formats

CoPre allows exporting in several industry-standard formats (e.g., LAS, LAZ, E57). Notably, the RCP format (Recap project) can be exported and directly opened in AutoCAD without any intermediate conversion.

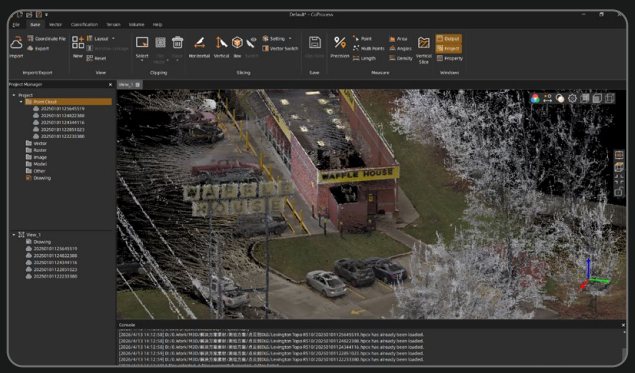


Step C：In-Office Drawing (CoProcess Software)

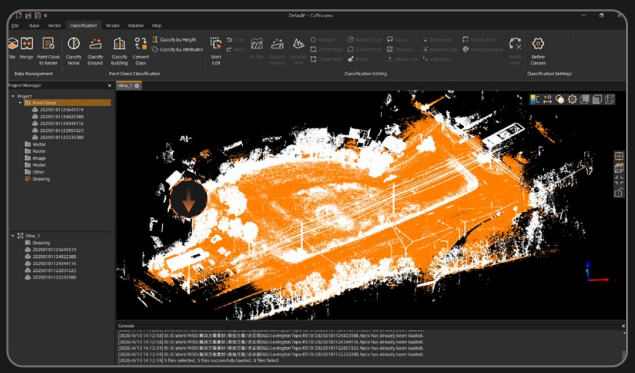
Point cloud import – The optimized point cloud was loaded into CoProcess.

(1) Point cloud classification

One-click intelligent ground point classification automatically separated ground points from vegetation, buildings, and other features.



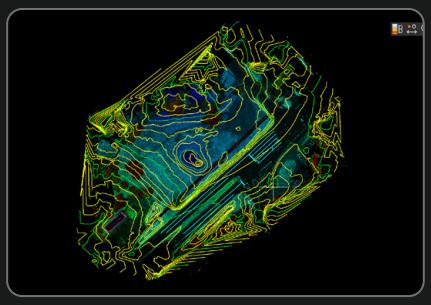
RAW POINT CLOUD (BEFORE)

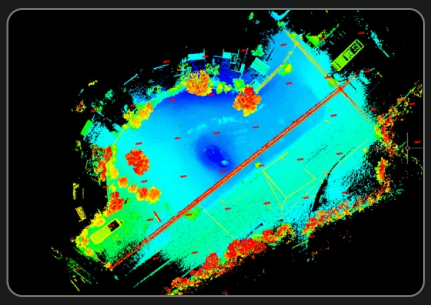


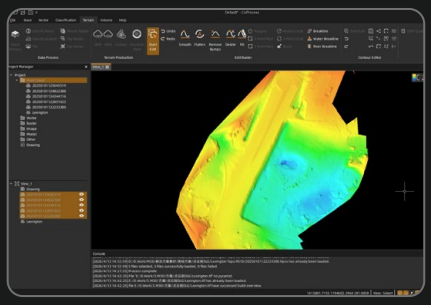
CLASSIFIED GROUND (AFTER)

(2) DEM & contour generation

From the classified ground points, a Digital Elevation Model (DEM) was generated with a single click, along with contour lines and elevation points (e.g., 1-ft intervals as required by the US project).

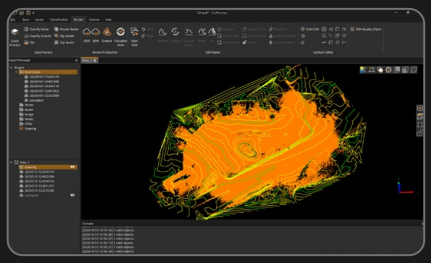






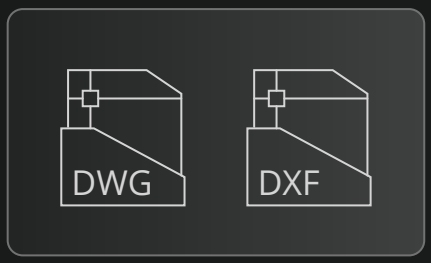
(3) CAD-style drawing environment

CoProcess provides an AutoCAD-similar interface: users can create and edit layers, snap to point cloud features, and draw vector lines directly on top of the point cloud.



(4) Export as DWG/DXF

The final line drawing (vector data) was saved as standard .dwg or .dxf files.

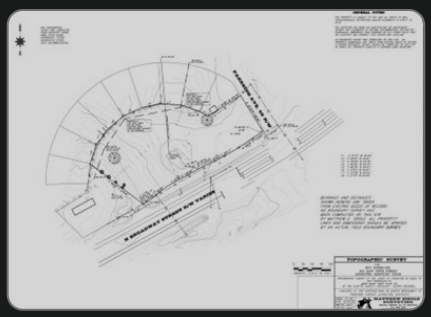


(5) Final Deliverable (US Mapping Standards)

Native AutoCAD compatibility – The exported DWG/DXF files opened directly in AutoCAD without any data loss or conversion errors.

Custom styling by Matt, the project surveyor, used his own pre-defined AutoCAD templates for line types, symbols, layer naming, annotation styles, sheet layouts, and markers – all compliant with US mapping standards.

Final topographic map – After minor touch-ups (adjusting contour smoothness, adding spot elevations, and verifying feature codes), a complete, production-ready topographic map was generated and delivered.



4. Conclusion

① The Lexington project proves that the RS10 and CoProcess ecosystem is the new benchmark for modern surveying. This solution is 5x more efficient than traditional RTK and operates seamlessly in No-Fly Zones.

② With its minimum-learning-curve software and seamless interoperability with CHCNAV GNSS hardware, this one-stop workflow significantly reduces labor costs and achieves truly high-efficiency mapping.

5. Customer Feedback

iGage Mapping Corporation

The workflow from RS10 SLAM scanning to vector drawing in CoProcess is incredibly efficient. What really stands out is the APIS feature – it lets us get a fixed RTK solution directly on the SLAM device, so we easily obtain point cloud data with a proper coordinate system. No guesswork, no post processing headaches.
The whole ecosystem – from field acquisition to final linework – is extremely friendly for topographic mapping. I know many surveyors are still using traditional or drone based methods, and they haven't seen what a complete SLAM to CAD solution can do. I really hope more people will try this new approach for topographic mapping. It saves time, reduces complexity, and just works. # iGage # CHCNAV team tim_qin@chcnav.com

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