

Use cases

E-Book

20+ ways to use
Hovermap

 emesent



Hovermap — a smart, versatile LiDAR scanning solution — makes mapping of challenging and inaccessible areas fast, safe and flexible.

Enabling data capture up to seven times faster than traditional methods, Hovermap delivers accurate, high resolution point clouds when flying, driving or walking.

As a drone payload, Hovermap combines advanced collision avoidance and autonomous flight technologies to safely and rapidly map hazardous and GPS-denied environments. Plug and play versatility allows the same Hovermap device to also be used handheld, mounted on a vehicle, backpack or ground robot, tethered to a cage or attached to a pole.

- Versatile: fly, drive, walk, tether—multi-application mapping
- GPS-denied flight—unaffected by GPS loss
- SLAM-based mapping—accurate mobile LiDAR mapping without GPS
- Tap-to-Fly autonomy—autonomous flight beyond line-of-sight and communication range
- 360° field of view—shadowless point clouds and omnidirectional collision avoidance



Improved safety

Keep personnel away from edges, confined spaces or heights. Fly Hovermap beyond line-of-sight and capture critical data to assess the condition of assets and improve safety decision-making.



Productivity & efficiency

Quickly and safely map inaccessible areas and assets with minimal disruption to operations. Fly, walk or drive Hovermap to capture data where and when you need it.



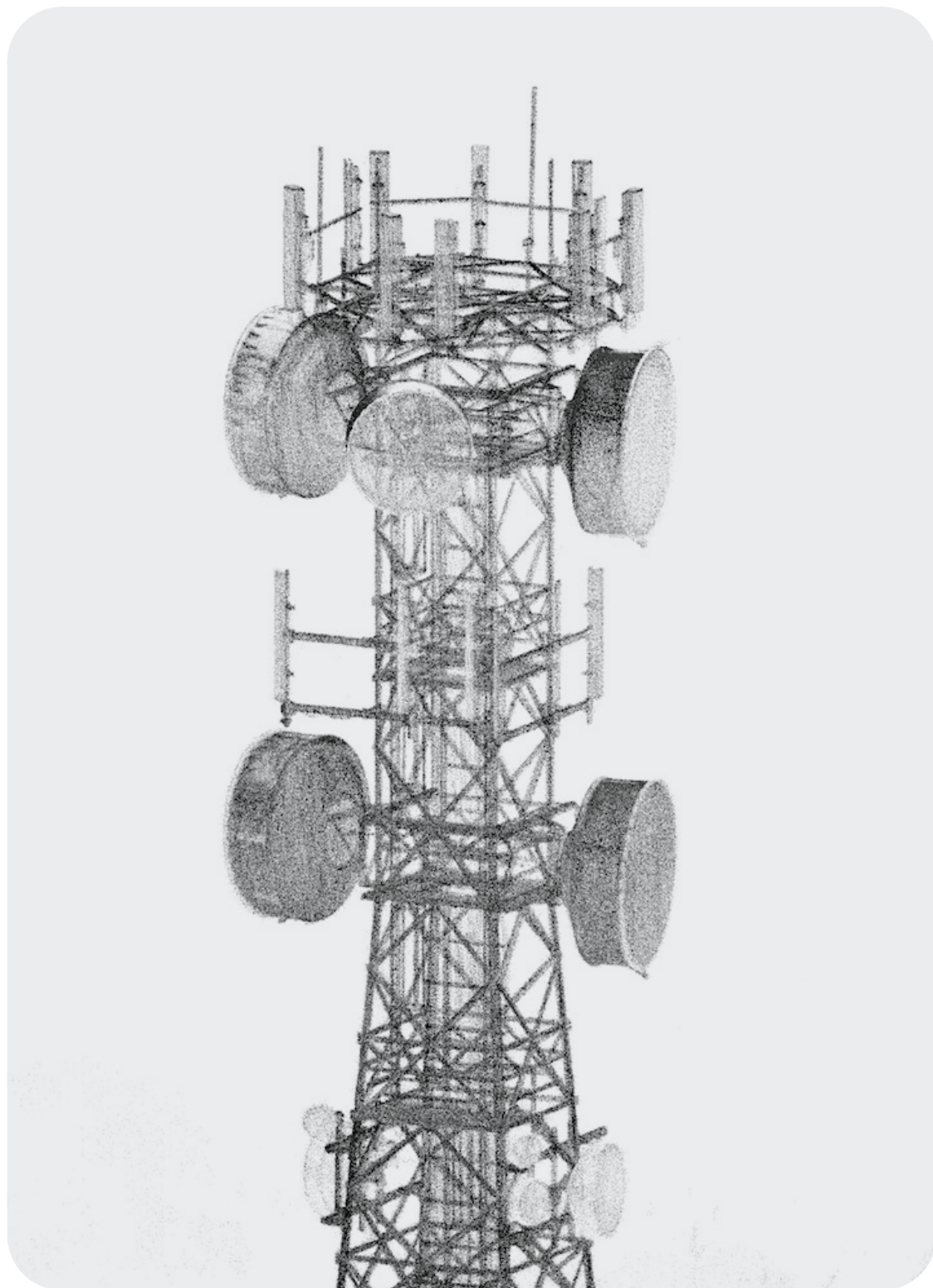
Greater insights

Explore and map inaccessible areas. Hovermap's beyond line-of-sight flight enables capture of accurate, high resolution point clouds without shadowing and delivers greater confidence in analytical or modeling outputs.



Cost & time saving

Hovermap pilots can fly an entire mission from take-off to landing using a tablet, with minimum training. With Hovermap it takes a few minutes to image complex assets that would take hours using traditional survey techniques.



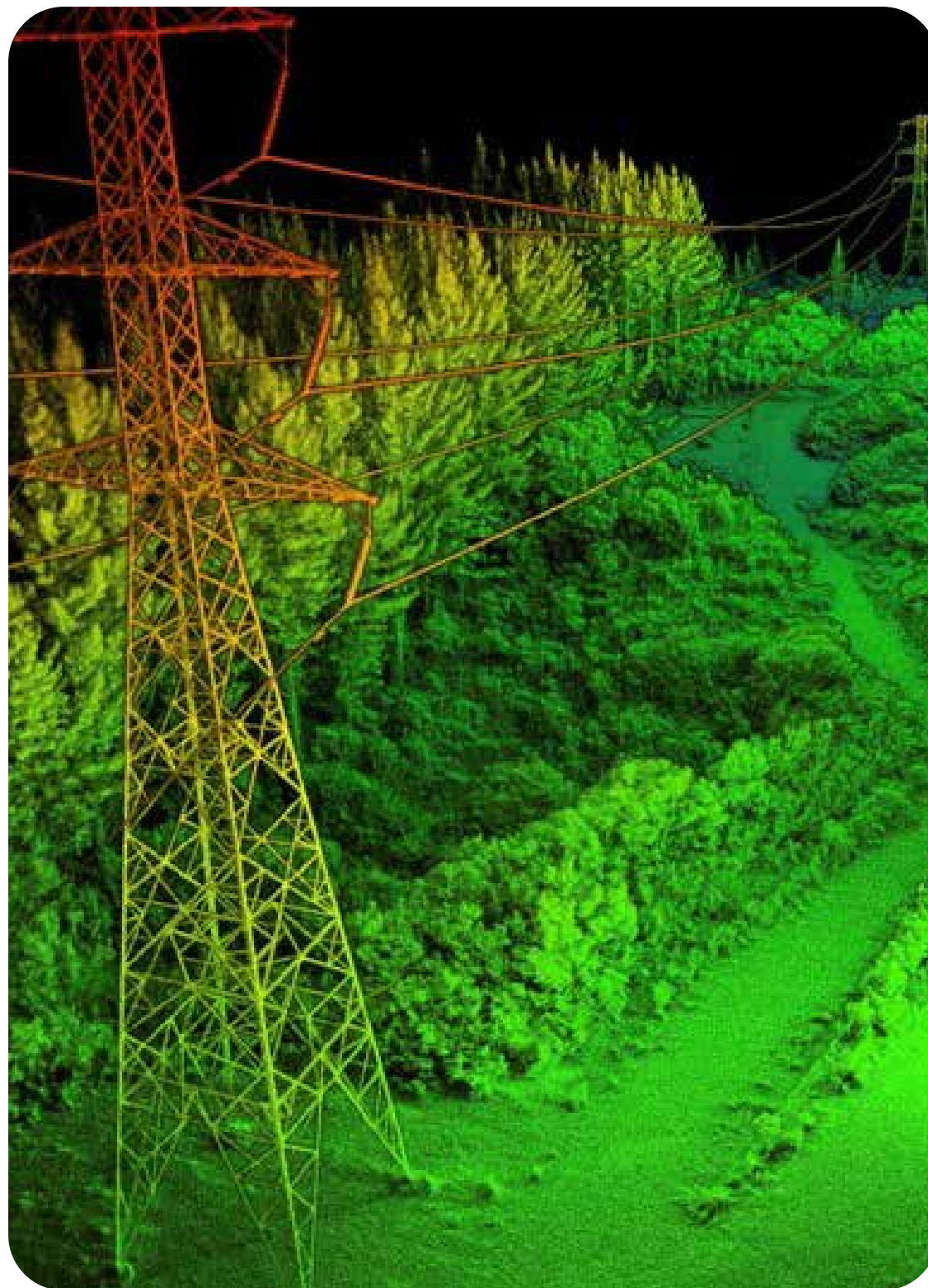
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Telecommunication towers

Hovermap maintains a safe standoff distance, keeping the asset, operator and drone safe, while capturing high resolution, high-quality point cloud data.

Applications

- Antenna direction confirmation
- Antenna mount inspection
- Condition monitoring
- Corrosion deformation
- Change detection
- Space availability for new antennas
- Structural analysis



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Transmission towers and lines

Hovermap flies along power lines for inspection of conductors, insulators, and towers, and to identify vegetation encroachment. The 360° field-of-view and SLAM ensure high-quality data capture continues even with loss of GPS.

Applications

- As-built
- Condition monitoring
- Vegetation encroachment monitoring



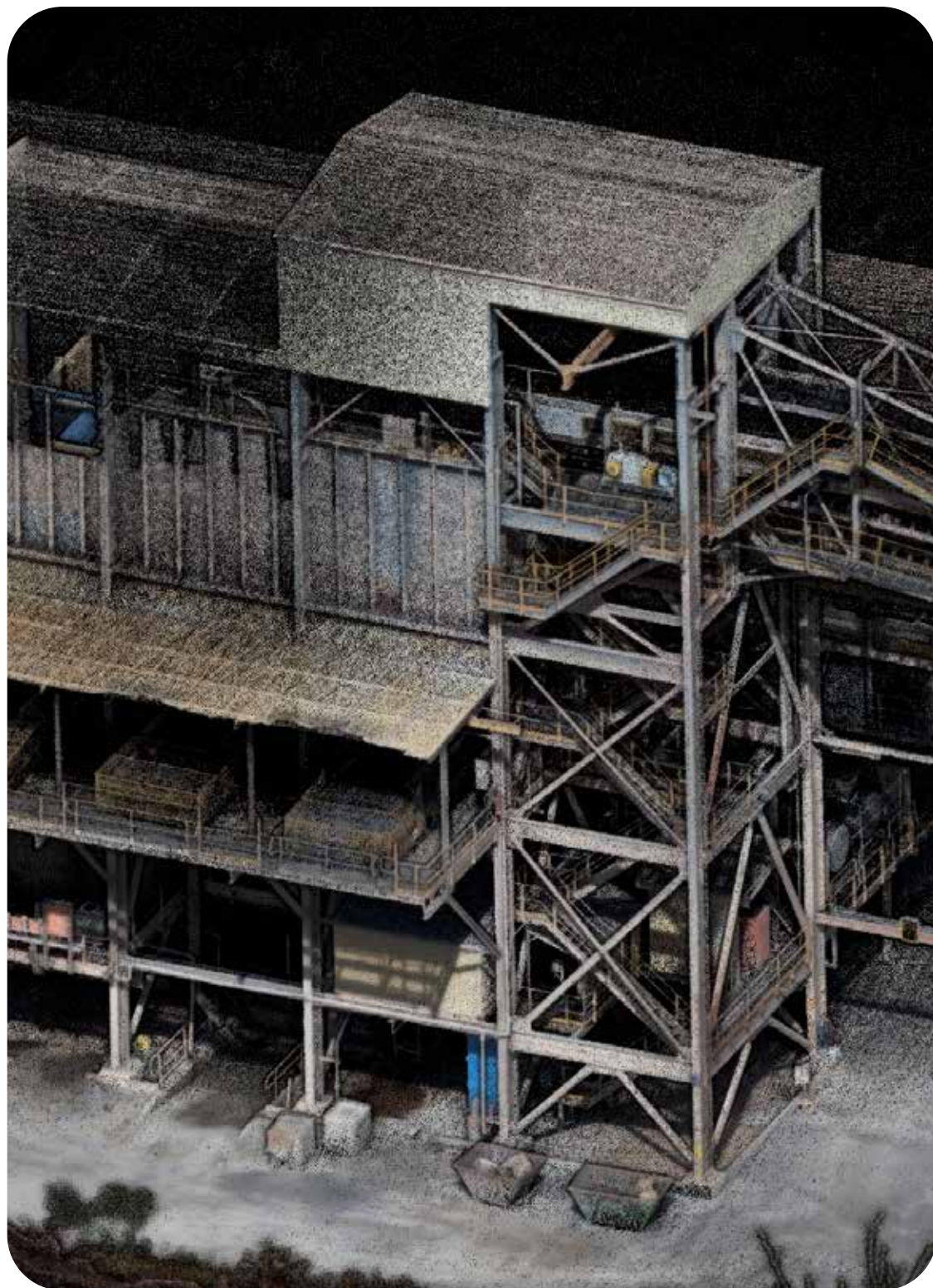
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Vertical shafts

Inspections of vertical shafts and structures occur during construction, in operation, or when abandoned. Current methods are hazardous to personnel and equipment, costly, time-consuming and typically result in low quality data. Hovermap can be flown or lowered in a protective cage to capture inspection data.

Applications

- Geotechnical inspection
- Seismic monitoring
- Airflow modeling
- Rehabilitation/shaft-closure



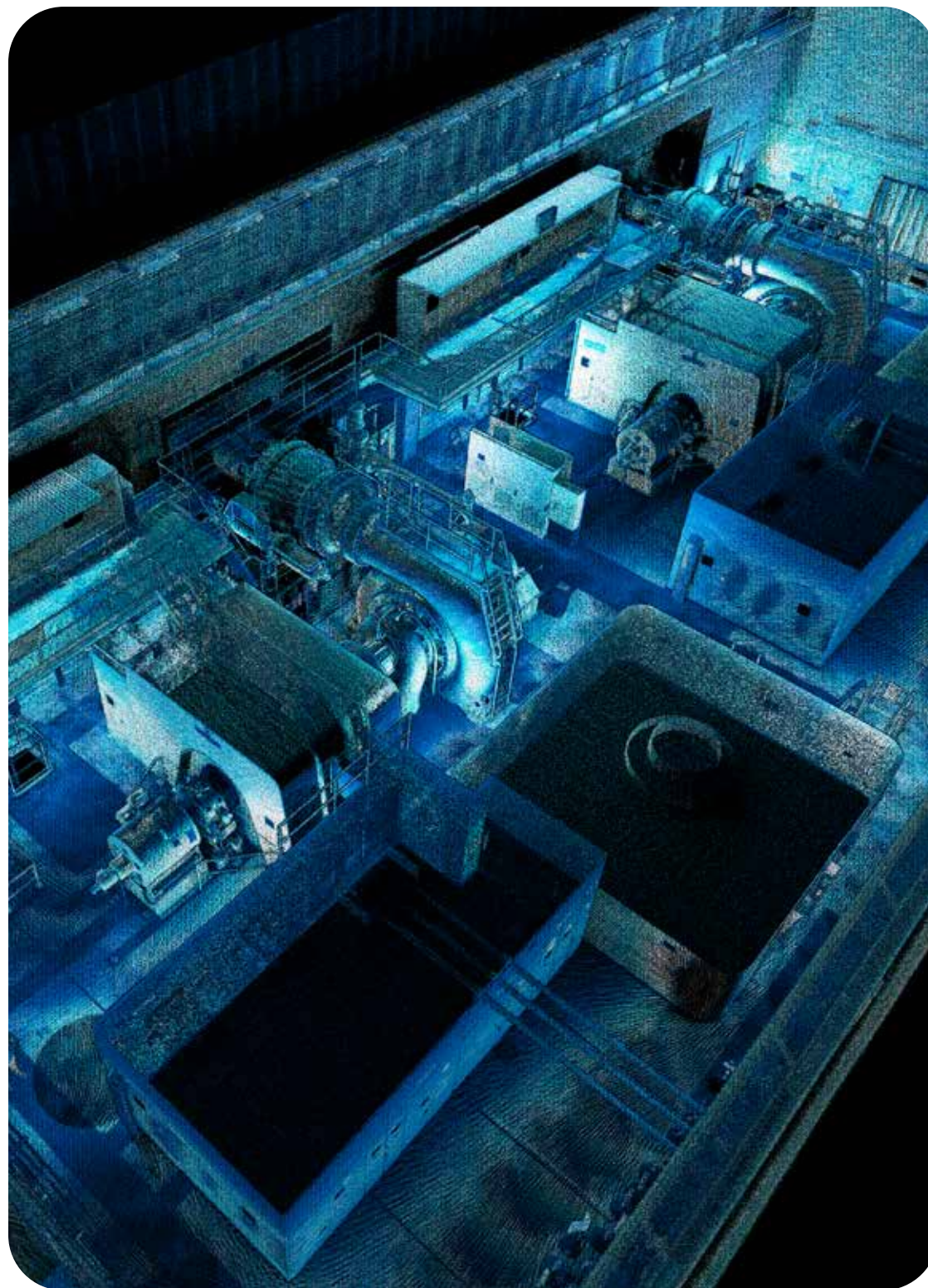
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Outdoor industrial plant

Whether scanning for an as-built or a safety and change detection inspection, Hovermap delivers high resolution, accurate data that can be registered to a spatial reference system or previous scans.

Applications

- As-built
- Condition monitoring
- Change detection
- Reverse engineering
- Safety and visual inspections
- Structural analysis
- Space management
- Stakeholder engagement



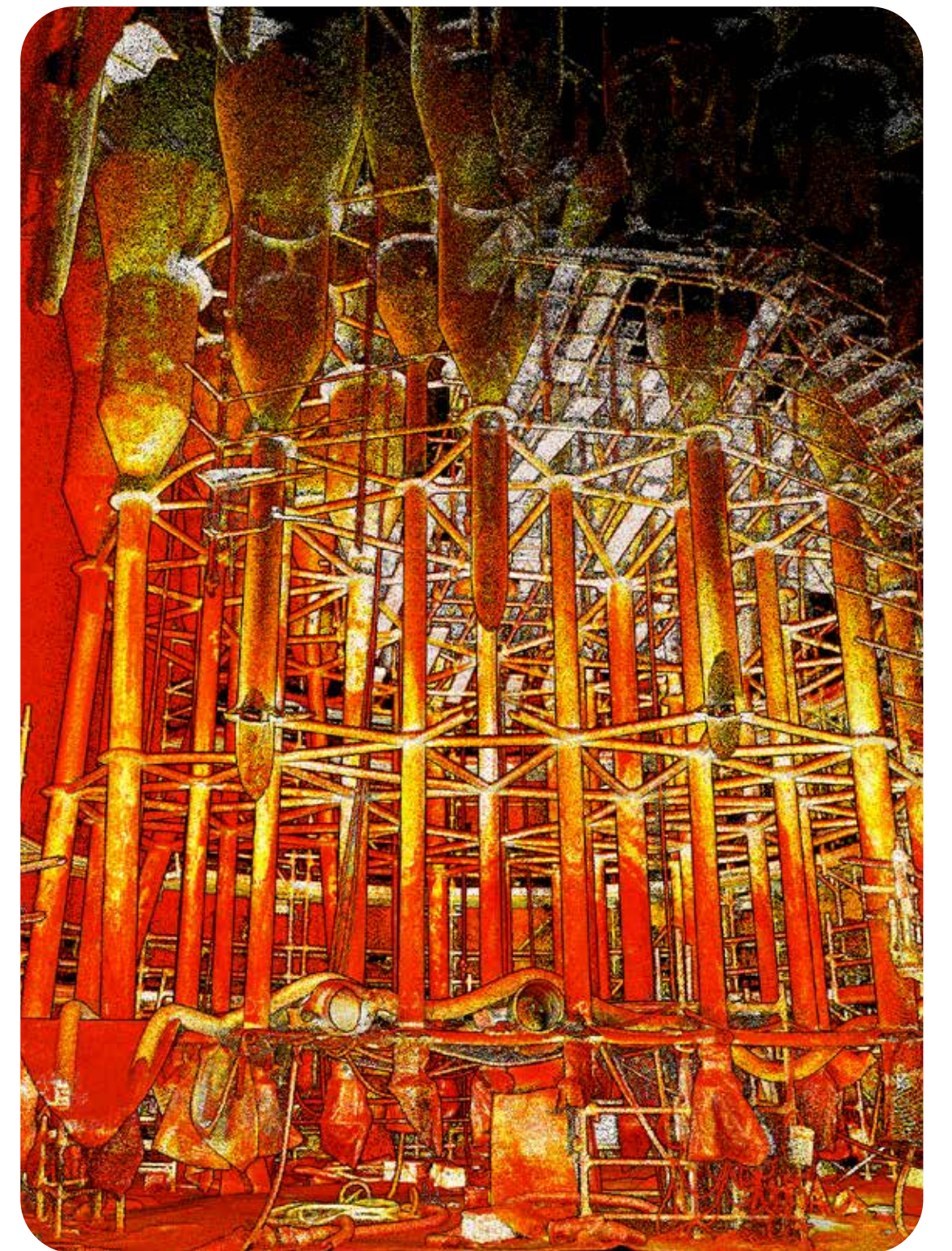
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Indoor industrial plant

Obstacles, moving equipment and narrow areas make these challenging GPS-denied environments to map, but ideally suited to Hovermap's capabilities. Advanced collision avoidance, SLAM mapping and versatile data capture methods enable accurate and rapid data capture.

Applications

- 3D models
- As-built / digital twin
- Change detection
- Pre-construction inspection
- Reverse engineering
- Safety inspection
- Stakeholder engagement



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Enclosed spaces (tanks)

Enclosed space inspections are extremely hazardous, but can be performed safely using Hovermap attached to a drone, or a tether to identify defects or functional issues.

Applications

- As-built
- Condition or functional assessment
- Deformation monitoring (bulging)
- Reverse engineering
- Visual safety inspections



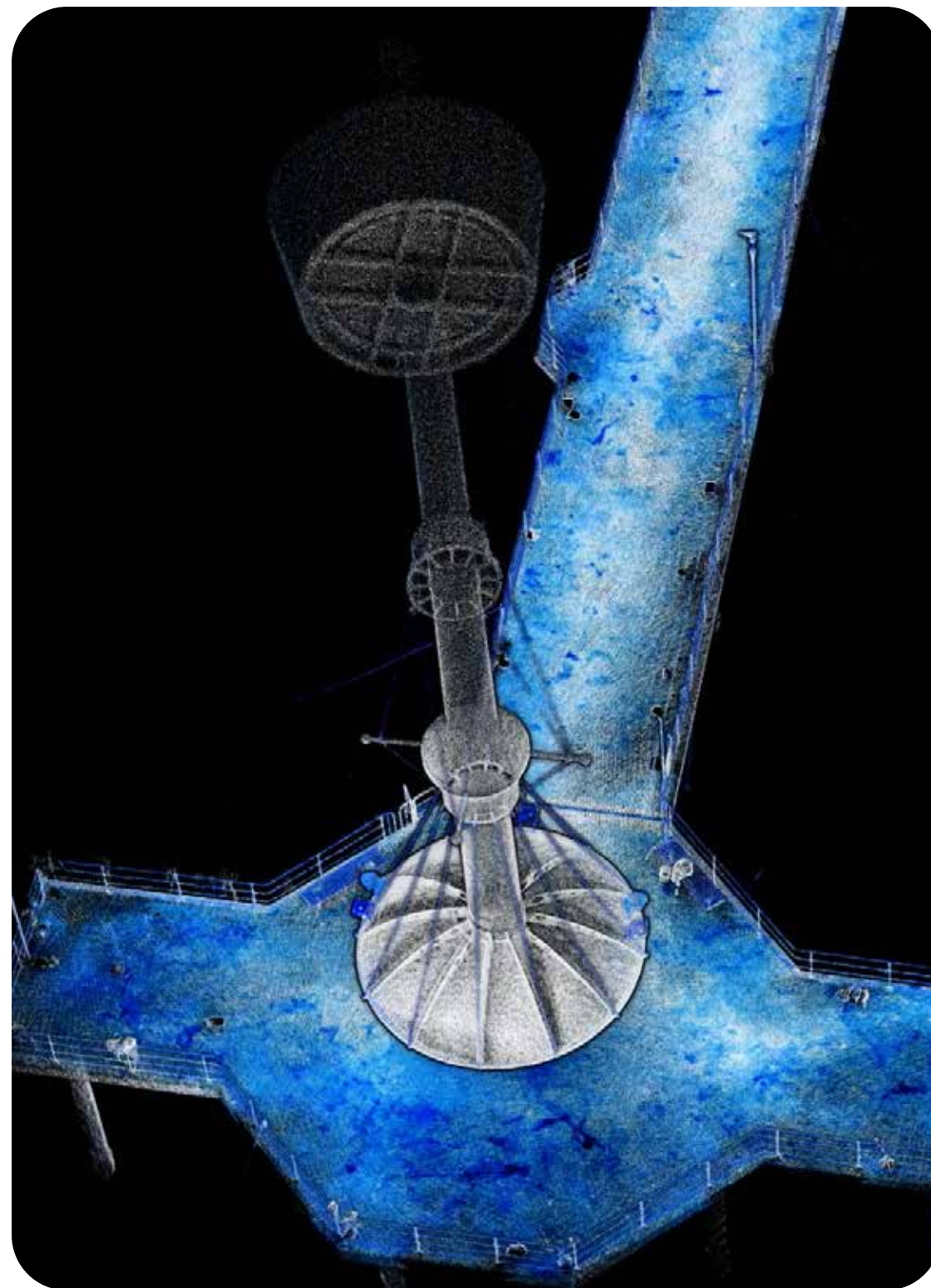
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Bridges

Any engineering work on bridges starts with accurate and high-quality data. Hovermap captures high resolution, accurate point cloud data of bridges, even in areas of GPS-shadow. Scans can be merged with hydrographic surveys or other scans at points of overlap to deliver a whole-of-asset data set.

Applications

- As-built
- Condition monitoring
- Reverse engineering
- Services inspection
- Structural integrity
- Visual inspection



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Piers and ports

Hovermap's versatile data capture methods enable scanning of above- and below-pier infrastructure with minimal disruption to operations. LiDAR scans merged with bathymetric surveys produce a complete data set of the asset.

Applications

- As-built
- Condition inspection
- Reverse engineering
- Sea level rise modeling
- Stakeholder engagement



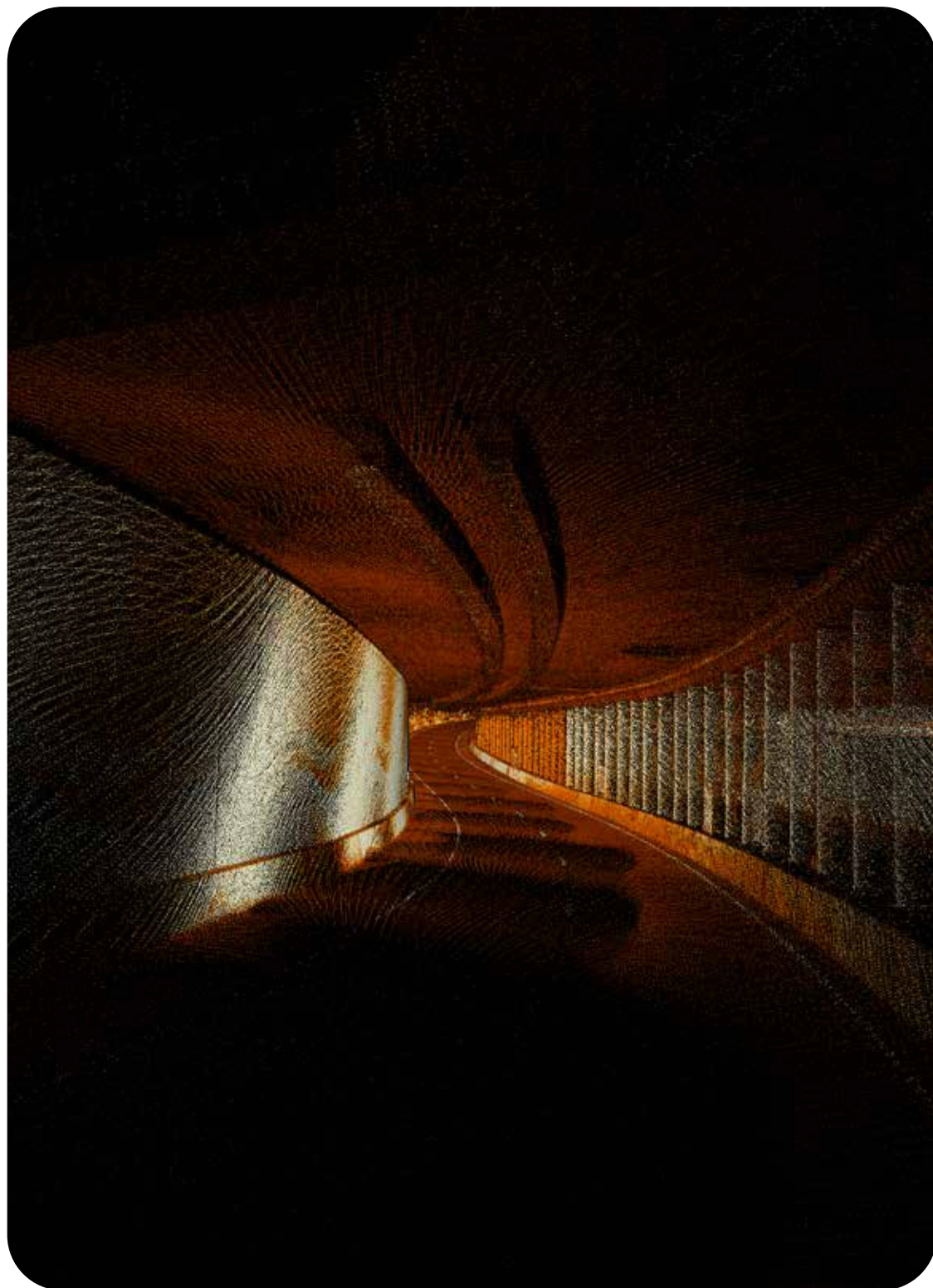
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Building and construction

Complex urban built environments are challenging environments to map. Hovermap negotiates tall or vertical structures, such as cranes, and flies in areas of GPS shadow to produce accurate, high resolution point clouds.

Applications

- As-built
- Clash detection
- Condition inspection
- Progress or QA reporting
- Reverse engineering
- Stakeholder engagement



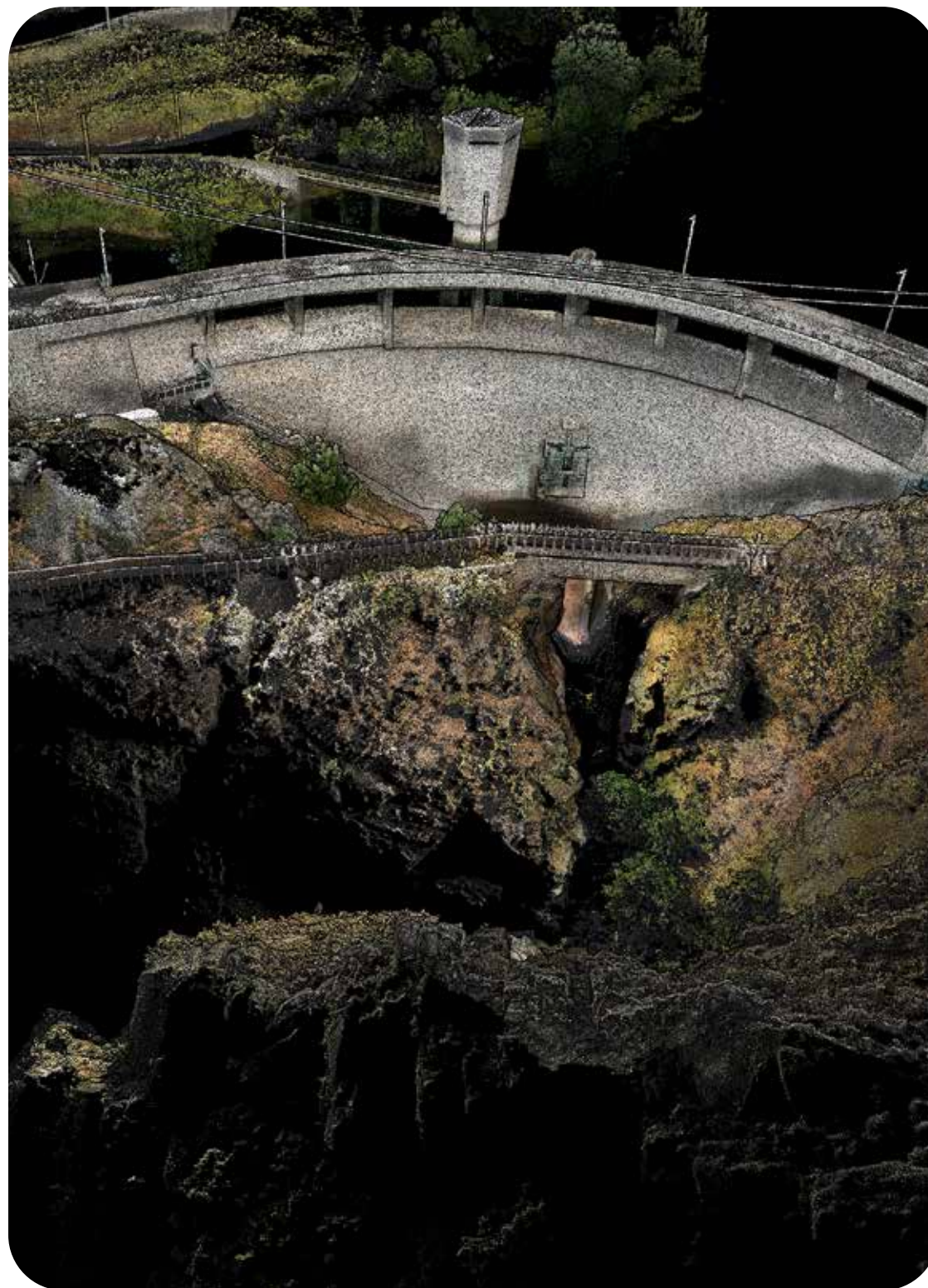
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Tunnels

Tunnels are vital infrastructure and require inspections to ensure asset safety, efficiency, and reliability. Hovermap rapidly and accurately scans these GPS-denied environments with minimal delay to construction or operations.

Applications

- Compliance inspection
- Condition monitoring
- Fire control
- Geotechnical inspection
- Services monitoring
- Ventilation modeling



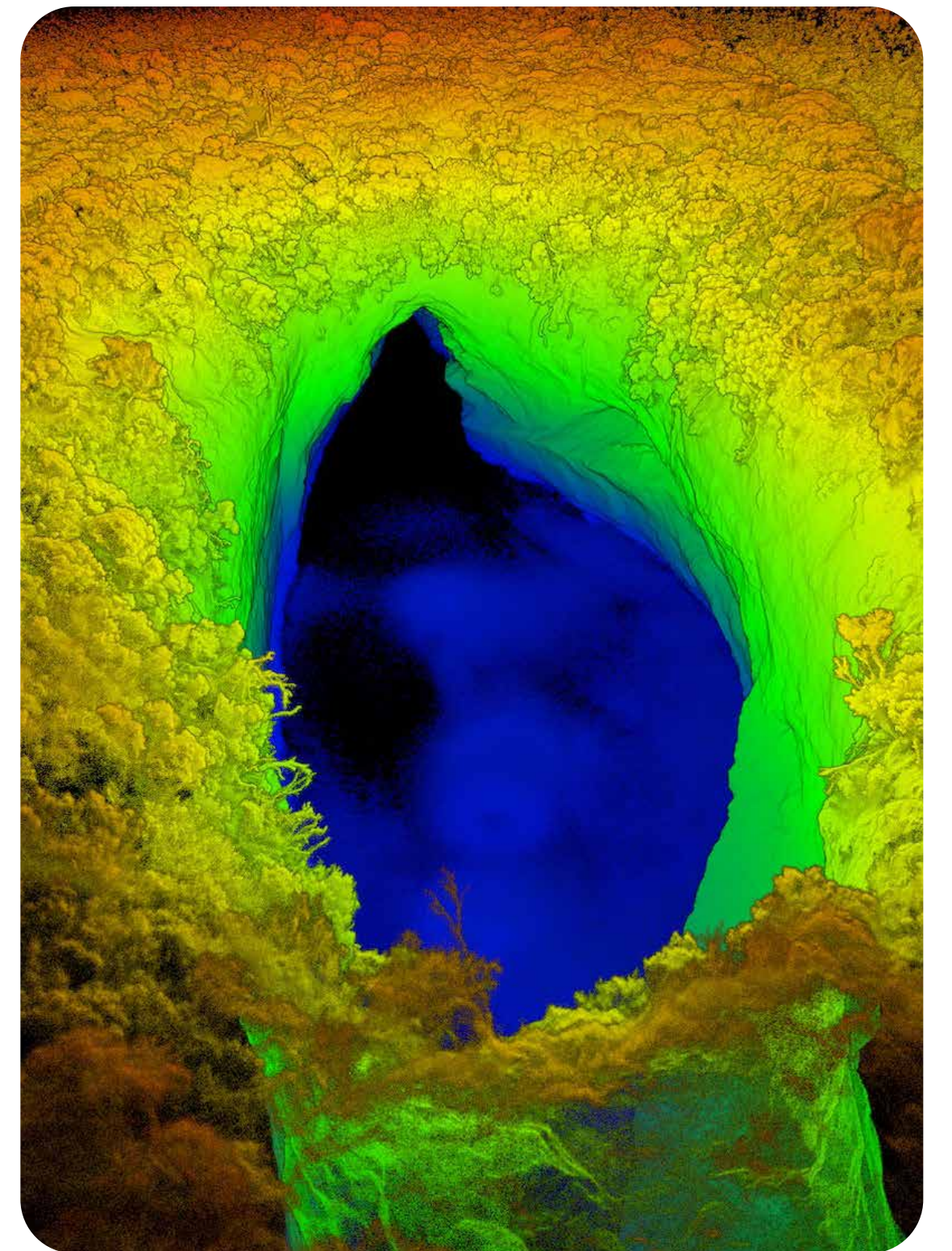
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Infrastructure

Infrastructure, such as dams, requires a variety of assessments, from geotechnical, hydrological, hydraulic, mechanical, and structural. Traditional terrestrial LiDAR scanning is expensive, time-consuming and may not capture the entire asset. Hovermap captures high resolution data across 100% of the asset.

Applications

- As-built
- Condition monitoring
- Reverse engineering
- Stakeholder engagement
- Surface moisture detection



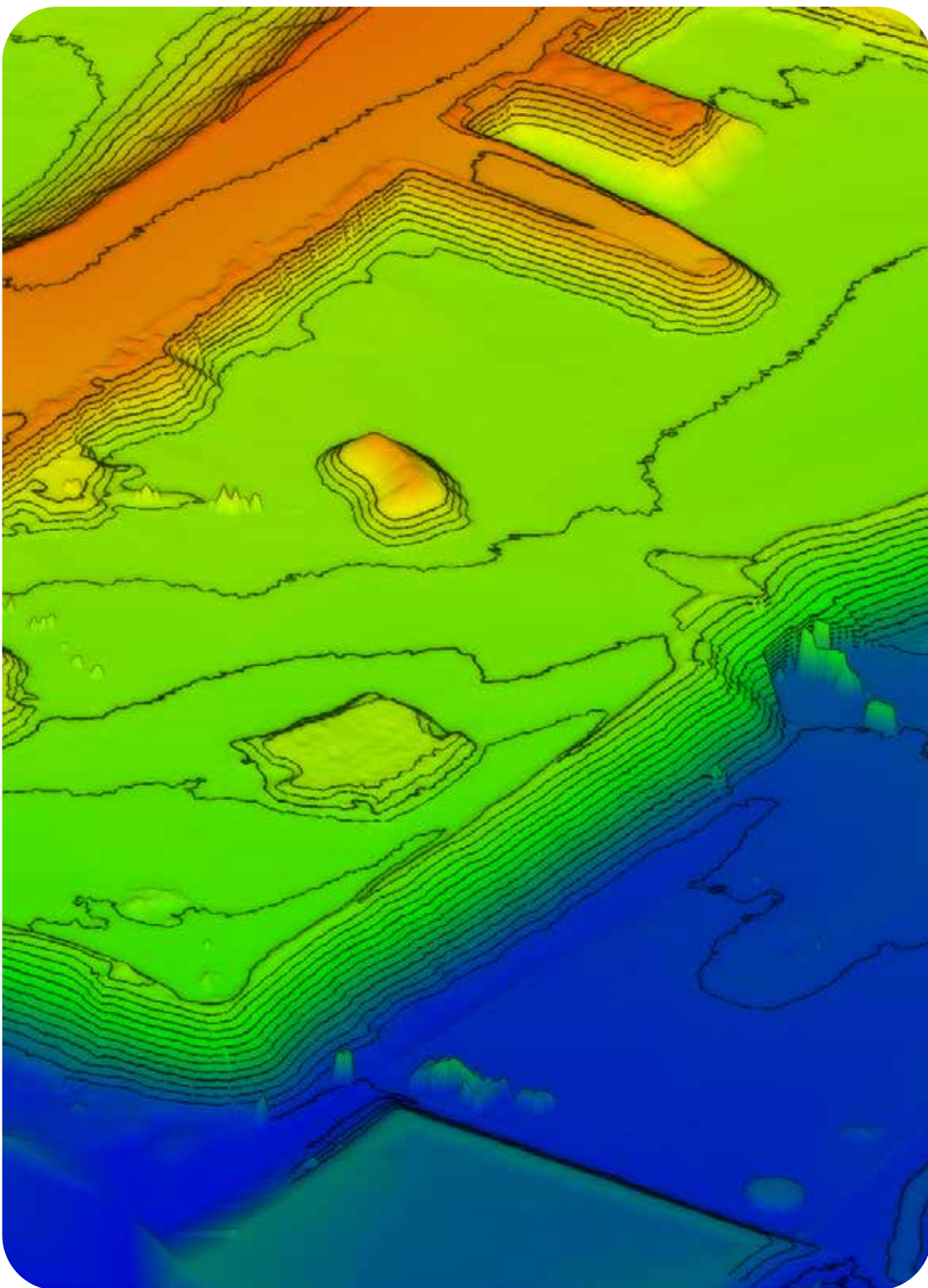
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Caves and cliffs

Hovermap's rotating LiDAR sensor captures data in all directions, making it ideally suited to scan along a cliff edge or map a cave system. A 360° scan using a traditional scanner requires two passes, but Hovermap captures these environments in one.

Applications

- Contour mapping
- Environmental assessment
- Pre-construction assessment
- Watershed analysis



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Terrain

A digital terrain model (DTM) is a 3D representation of a terrain surface, created from elevation data, with objects such as vegetation or infrastructure digitally removed. Hovermap flies above and below the canopy to capture a complete picture of the terrain.

Applications

- Modeling flood and drainage
- Subsidence modeling
- Land use and management
- Geological studies



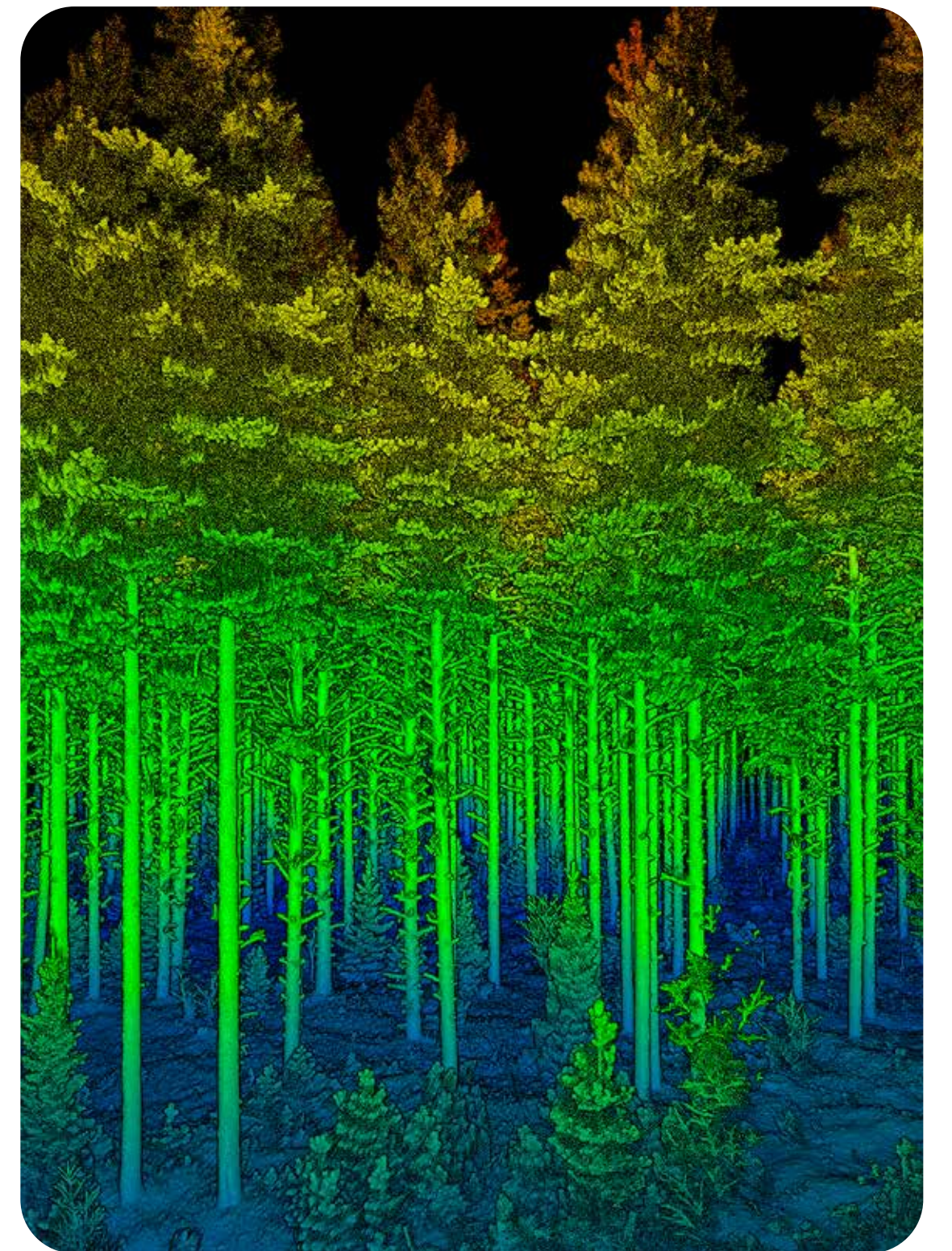
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Stockpiles

Traditional stockpile survey methods can be slow, require multiple setups, and may not achieve 100% coverage. Hovermap's measured point cloud data informs accurate volumetrics and a wide range of other slope and stockpile analyses.

Applications

- Contour mapping
- Fragmentation
- Slope and stability analysis
- Volume (indoors and outdoors)



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Forestry

Mapping plantations is set to revolutionize forestry management. While existing solutions capture above canopy, Hovermap captures above and under canopy data to create a complete picture of a forest and characterize individual trees by location, size, straightness, and branching.

Applications

- Canopy structure analysis
- Tree thinning
- Wood volume calculations
- Watershed modeling



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Crop management

LiDAR is widely used in agricultural science to identify crops, estimate planted area and yield. Manned airborne operations, often costly and susceptible to cloud cover, are being replaced by drone-based LiDAR, such as Hovermap, which are more cost efficient and offer more flexible operations to better inform crop management decisions.

Applications

- Detection of pests and disease
- Estimation of crop yield
- Monitoring crop growth
- Plantation management



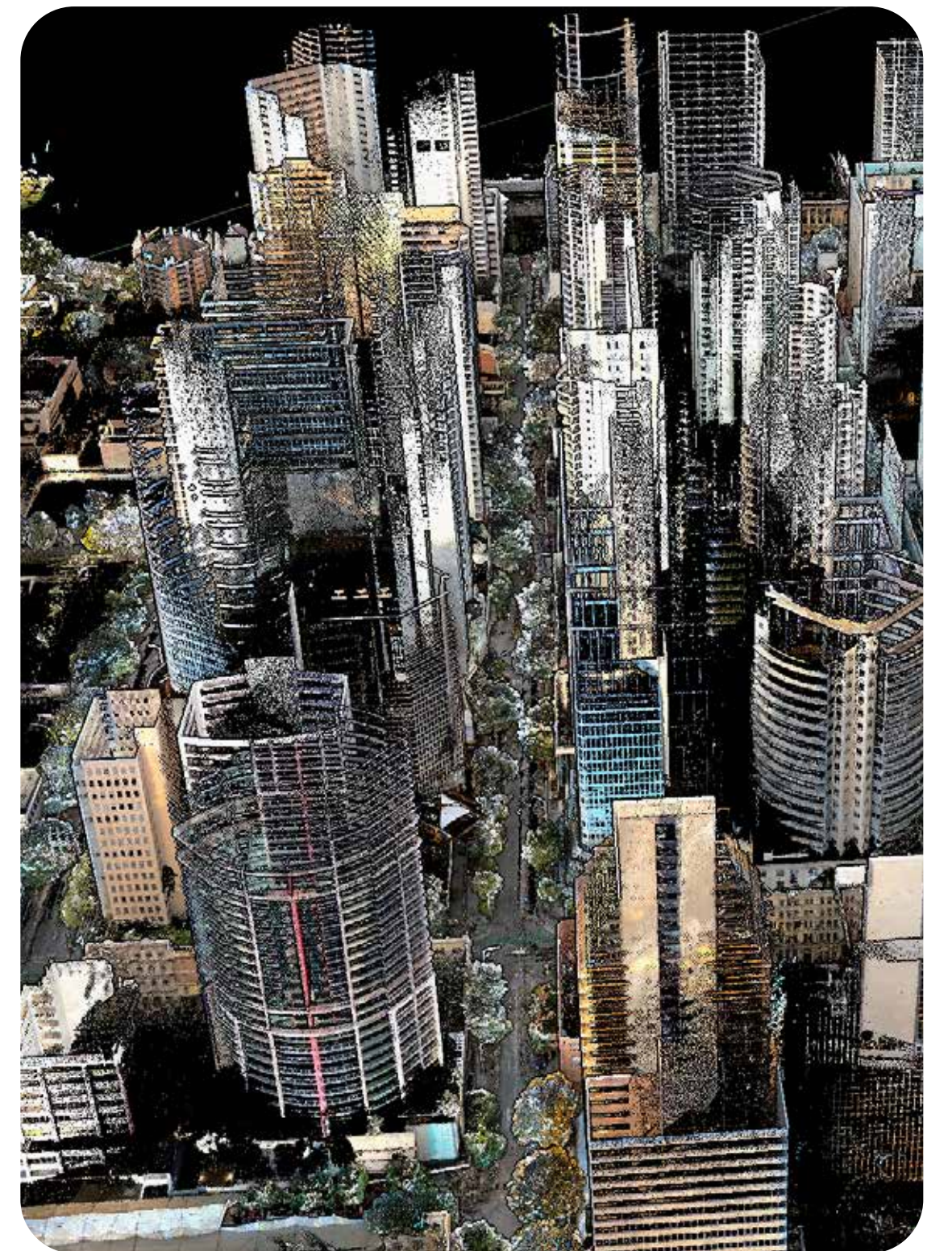
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Cultural heritage

Constructed with no or little spatial information, heritage buildings and structures require up-to-date data prior to and during preservation, redevelopment, or construction activities. Hovermap's virtual shield ensures the drone maintains a safe distance while it captures high resolution, colorized data.

Applications

- As built
- Pre-mediation inspection
- Progress monitoring
- Public marketing
- Stakeholder engagement



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Urban mapping

As local and city governments move to digitized 3D models for city planning, the need for rapid collection of data suitable for Level of Detail 3 or 4 increases. Hovermap's versatility and dense colorized point clouds make it an ideal solution for urban mapping.

Applications

- As-built
- Context modeling
- Construction sequencing
- Lighting/shadow studies
- Viewshed analysis
- City planning
- Corridor management



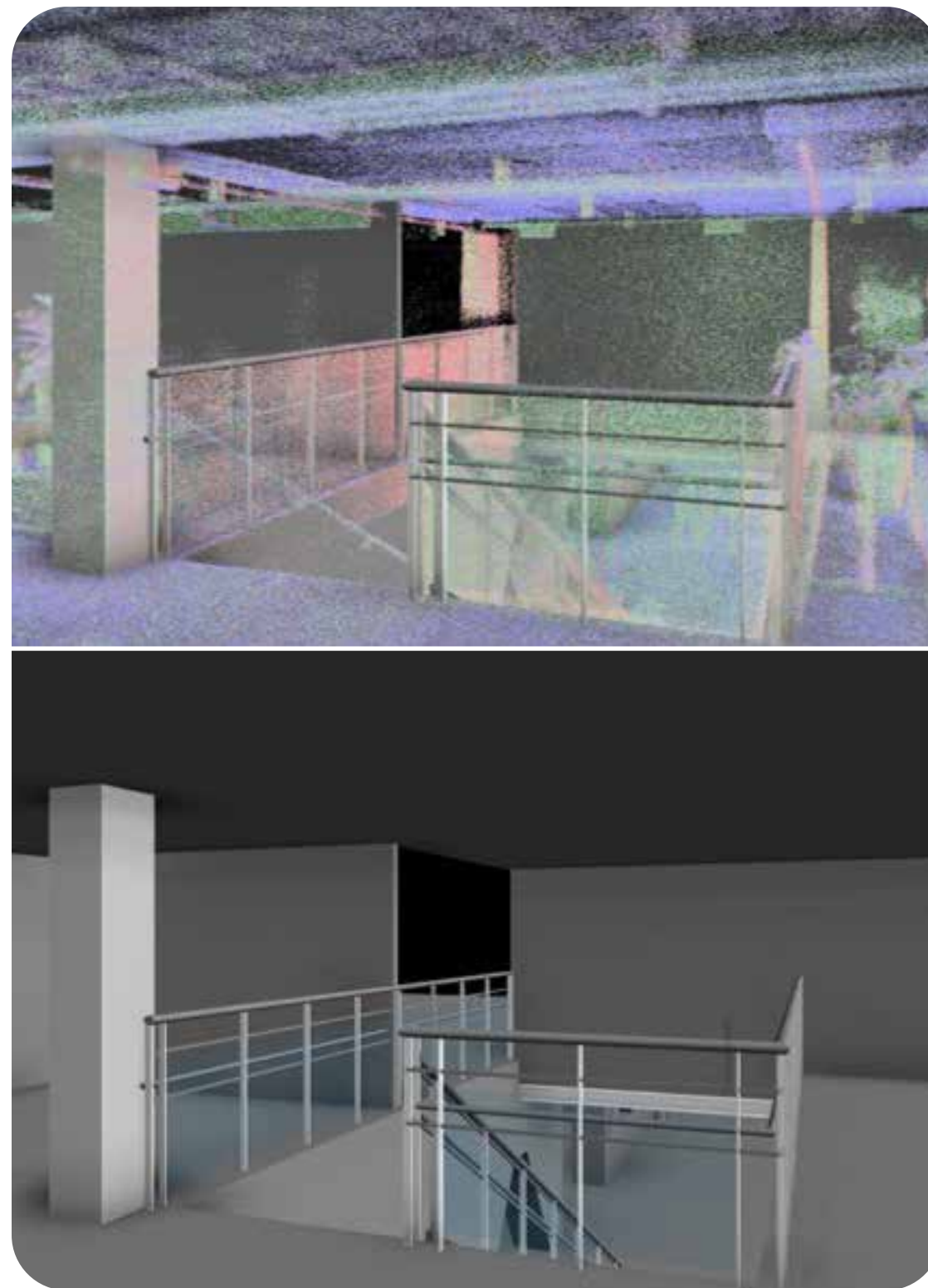
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Space optimization

“Does it fit?” is the key question to answer prior to moving equipment or an asset from one location to another. Scan the asset, the transport route, and the new location for virtual fit prior to relocation.

Applications

- Clash detection
- Space management
- Stakeholder engagement
- Transport corridor clash detection



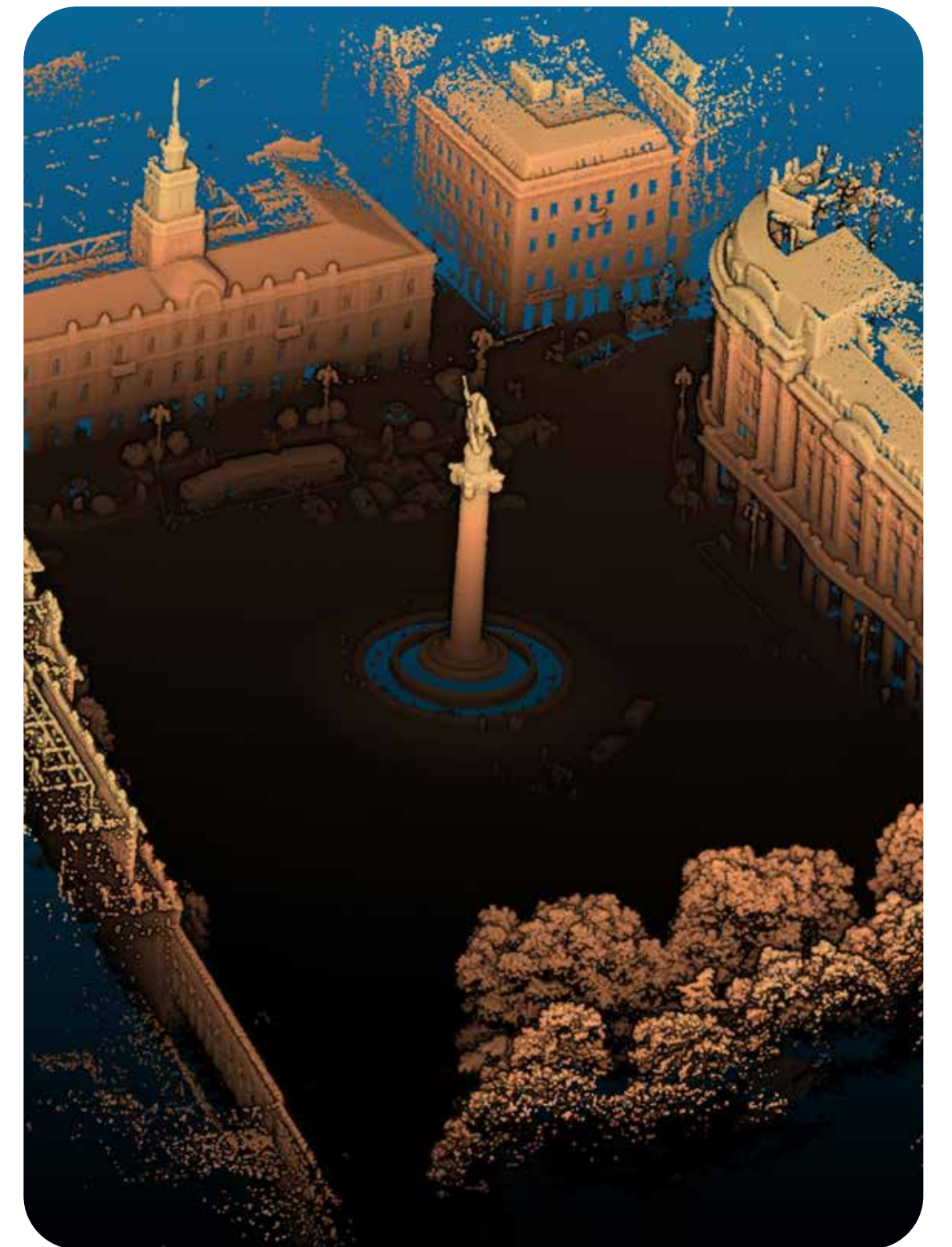
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BIM

The construction industry relies on accurate 3D Building Information Modeling (BIM) to efficiently plan, design, construct and manage buildings and infrastructure. Fly, walk, or tether Hovermap to quickly capture accurate and shadowless data for complex built environments.

Applications

- As-built
- Clash detection
- Information sharing
- Mechanical, electrical, plumbing design
- Project collaboration



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Virtual effects (VFX)

When operating on a live set to capture VFX data in the film industry, speed is key. With Hovermap, scanning a set can now occur between takes, capturing areas in 5 minutes that would have taken an hour. Hovermap can capture above buildings and around complex set pieces, areas that traditionally had no effective LiDAR capture method.

Applications

- 3D modeling
- Overview scan of sets and piece locations

Emesent Hovermap

Hovermap incorporates the latest in LiDAR sensing technology to offer high density point clouds with exceptional coverage.

Featuring a sensing range of up to 300 meters and returns of more than a million points per second, Hovermap captures detailed, accurate data over a wide area fast – accelerating your time to insight. Hovermap’s range of autonomy levels and versatile deployment options give you the flexibility you need to effectively scan the environment, as well as the confidence in complete data capture. In all modes, a live point cloud is streamed to the Commander app, providing a real-time preview of the data as it is captured when in communication range.

“Hovermap’s handheld SLAM was a game changer to map a unique heritage site, especially for the spiral stairs and underground tunnels. Its compact design made it fast and easy”

Nicolas Herbert, Président, Escadrone



Hovermap Features

- Single device with multiple deployment options
- Mapping, autonomy and pilot assist
- Sub-centimeter accuracy
- Not reliant on GPS
- Easy to train, use and deploy
- Equally effective data capture in zero light environments
- Merge multiple scans, georeference, capture still images, animate and colorize
- Capture and measure line of sight, width, volume
- Analyze data in multiple ways, including time, intensity, height
- Real time onboard processing with 3D data live streamed to the operator



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About Emesent

Emesent is a world leader in robot autonomy, LiDAR mapping, and data analytics, founded after a decade of cutting-edge research at the Robotics and Autonomous Systems arm of the Commonwealth Scientific and Industrial Research Organisation (CSIRO). As well as being well established in a number of industry sectors, we collaborate with customers and partners to explore new possibilities and innovate novel proof of concepts.