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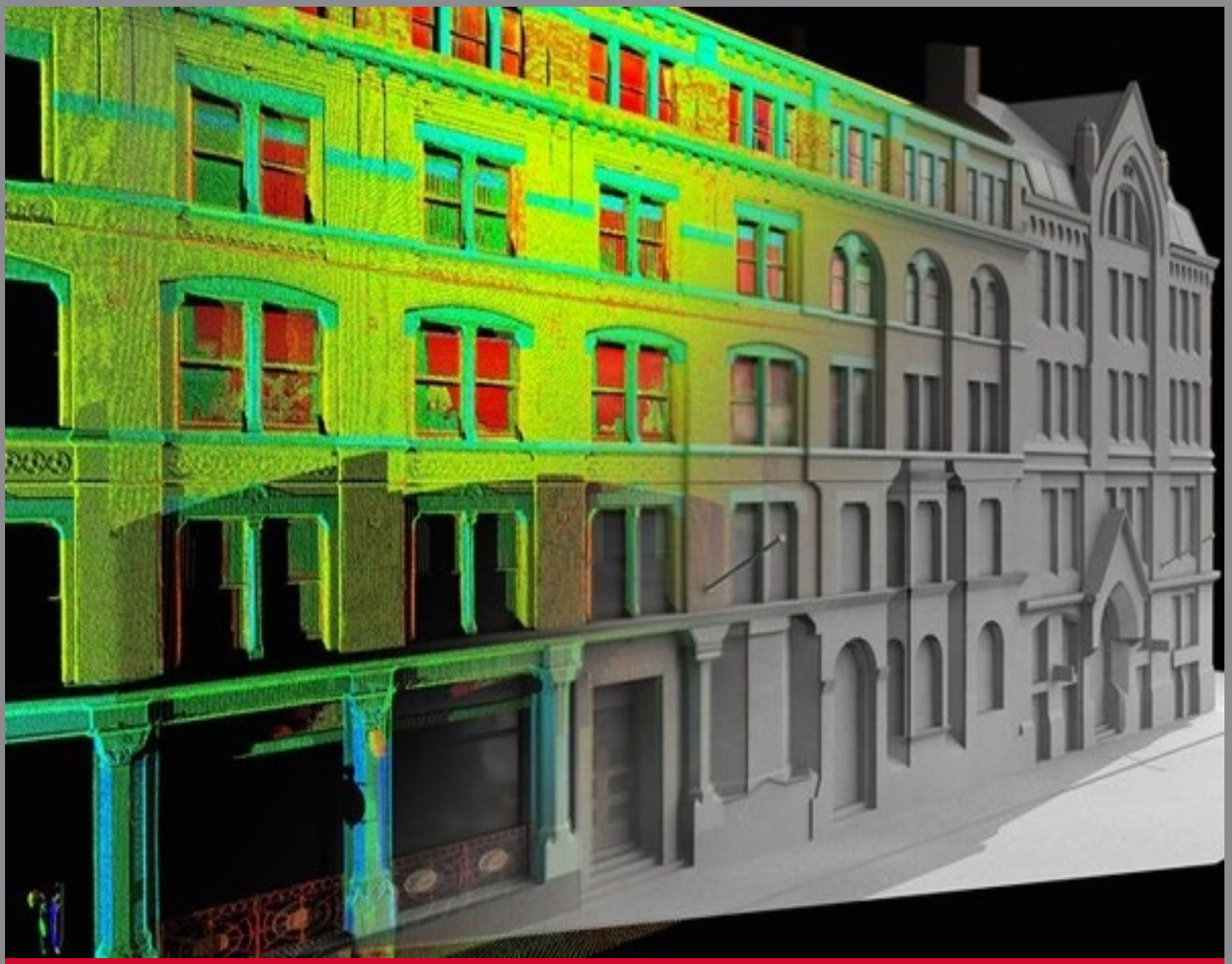
Laser Scanning & BIM

SURVEYING PRECISION

aksm
land·building·industrial
SURVEYING & MAPPING



THE COMPANY

In today's complex construction environment our innovative expertise, analysis and carefully crafted approach can help bring security to construction process. We work closely with you to develop an appropriate plan, tailored specifically to your needs. We are committed to exemplary service, high ethical standards, and integrity in all aspects of our business.

AKSM was founded in 2001 in order to provide turnkey, surveying solutions in the area of construction, industry and high accuracy geodetic applications. The personnel of AKSM consist of professional surveyors, experienced in most types of engineering. After 15 years, we have managed to expand our areas of expertise in order to meet the growing needs of our clients, through the training policy the company applies, by purchasing the latest available on market equipment, by incorporating special surveying technics into our services.

AKSM is taking part in all stages of construction starting from the initial design, until the final operation, thus it collects and provides accurate and updated field data to all planners, it ensures the constructed quantities, it manages the flow of information between the technical office and the site.

Laser Scanning

EXPERIENCE

Over 40 construction projects

- Personnel & equipment provision
- Method statement provision
- General setting out plan creation
- Network installation & maintenance
- Quantity surveys – Cost control
- Determination and control on building's elements
- Geometry verification and as build surveys.
- ISO standards incorporation – quality control records
- High accuracy applications in corporation

High accuracy & Industrial Applications

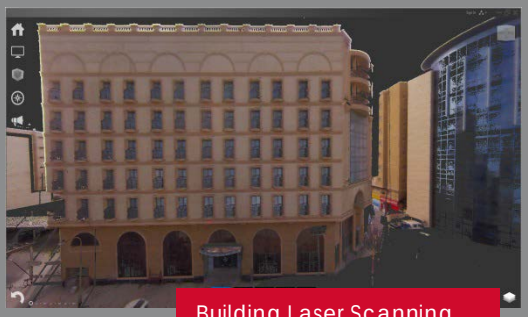
- Control of axes : alignment, parallelism, verticality, flatness
- Position alignment on large engines or assembly of different parts (flanges, anchors, e.t.c.)

Laser Scanning and Monitoring Applications

- Real time AMS deformation monitoring
- Geometry control and verification on prefabricated parts of large constructions in projects like bridges, pipes, wind power generators
- Survey and geometry determination through point cloud collection.
- Deformation analysis

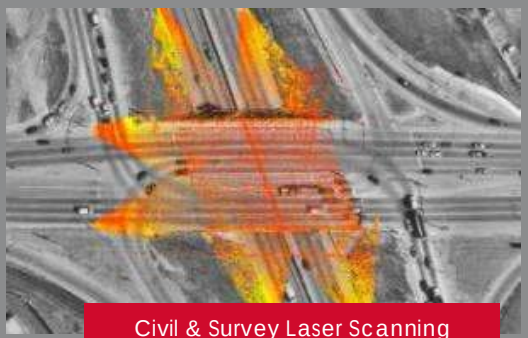
LASER SCANNING

- It is based on exceptionally dense mapping of three-dimensional coordinates of the points on the surface to be surveyed, taken at speeds ranging from a few thousand up to a million points per second.
- Depending on the object (size, shape, desired accuracy), laser scanning may be airborne or terrestrial, static or mobile, autonomous or in combination with other standard topographic methods.
- With the scanner devices, known as LIDAR (Laser Induced Differential Absorption Radar), recording of millions of points is succeeded by creating a cloud, where every point has xyz coordinates in space.
- Laser Scanning is a rapid and reliable surveying method, which provides more accurate products than every other methodology. The big point density in combination with the ability of color information at each point approaches the term of "virtual reality".

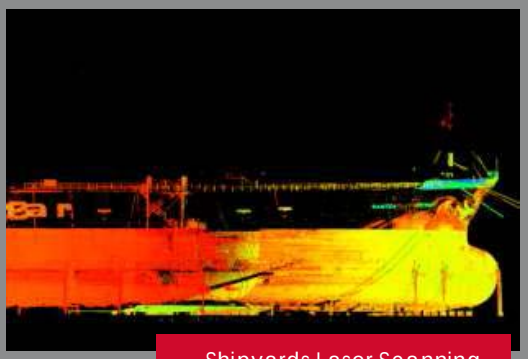


Building Laser Scanning

Industrial Laser Scanning



Civil & Survey Laser Scanning



Shipyards Laser Scanning

APPLICATION AREAS

Building & Heritage
- As – built 3D models
- As – built 2D drawings
- Full color visualization

Industrial
- Intelligent 3D CAD as – builts
- Retrofit application in plants refineries
- Construction planning

Civil & Survey
- Topographic road, rail surveys
- Volumetric calculations in pits, dams, e.t.c.
- Tunnel surveys

Shipyards
- Dry dock for yachts
- Hull scanning
- Ship interior scanning
- Accurate marking of water lines
- Shaft alignment & vibration analysis
- Thermographic surveys

ARCHITECTURE & BUILDING

Applications

- Producing 2D drawings or 3D CAD models for refurbishment and restoration projects
- Internal building surveys for floor plans
- 3D urban modeling for planning studies
- Detailed architectural scanning for preservation
- Construction QA and dispute resolution
- BIM (Building Information Models)

Benefits

- Faster, safer, less costly, more accurate, and
- more complete building surveys
- Minimizes impact on use and operation of the building during survey
- Point clouds combined with full-color imagery
- provide powerful, accurate visualization
- Better 3D city visualization, planning and analysis
- Leverage autoCAD and MicroStation CAD tools

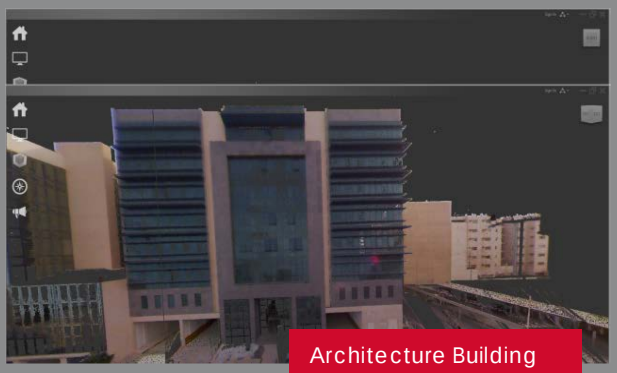
HERITAGE & MONUMENTS

Applications

- Detailed recording and preserving of ancient buildings
- Monuments, archeological sites and items of cultural heritage
- Production of drawing to aid restoration and reproduction work
- 3D data collection for movies and walkthroughs for virtual tourism applications within websites and DVD's

Benefits

- Faster, safer, less costly, more accurate, and more
- complete surveys of complex heritage sites
- Non-contact, remote survey reduces potential damage to sites and improves survey safety
- Reduces sites visits needed for data capture
- Full-color camera options add extra level of information to point clouds for richer analysis



Architecture Building

Heritage & Monuments

HEAVY INDUSTRY

Applications

- As-builts for retrofit plant design: oil & gas, petrochem, chemical, water, power and mineral
- Remote survey of difficult and dangerous facilities:
- nuclear, offshore and underground
- QA check of fabricated parts against the design
- Construction and demolition planning
- Documentation for operations & maintenance

Benefits

- Faster, safer, less costly, more accurate, more complete as-builts
- Reduces retrofit design & construction errors
- Reduces plant downtime from construction problems
- Faster, better retrofit design
- Reduces site visits & time on site for data capture
- Lets users leverage existing 3D design software for design and clash detection directly with scans.

CIVIL SITES

Applications

- Topographic and structure surveys
- Roads, bridges, tunnels, rail, airports, power distribution, telecom
- Construction QA & monitoring
- 2D maps, 3D models, DTM's
- Asset management, e.g. bridge clearances for truck route planning
- Topographic diagrams, site, planimetric surveys
- Commercial, public, residential properties
- 2D maps, DTM's
- 3D scanning & 3D modeling of buildings, monuments
- constructions, objects
- Application studies & as built drawings
- Project supervision & project management
- Urban, environmental and hydraulic design
- Environmental impact design

Benefits

- Faster, safer, less costly, more accurate, and more complete topographic & as-built survey
- Ability to re-use data instead of returning to the site for additional
- surveying
- Minimize road, airport, etc. closures for surveying and impact on site construction and site operations during surveying
- Ability to survey at night when site/asset may not be in use

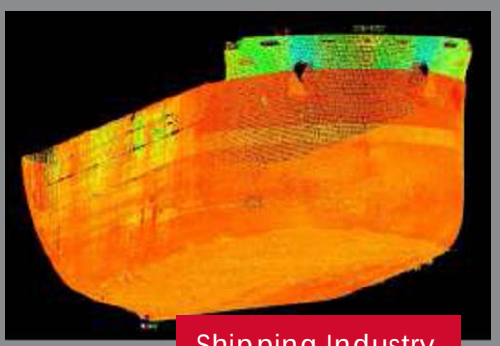
SHIPPING INDUSTRY

Applications

- 2D and 3D as-builts of hull, frames, cabins, rooms and onboard plant & equipment for ship modifications and new construction
- Fabrication and construction QA
- Construction & installation planning
- Shaft alignment
- Merchant, military and leisure vessels

Benefits

- Faster, safer, less costly, more accurate, more complete as-builts
- Reduced refit design and construction errors
- Survey while at sea for parts fabrication pending arrival at base
- Virtual walkthrough for shore-based engineers
- Ability to re-use data instead of returning to the ship for additional
- surveying
- Ability to re-use data instead of returning to the ship for additional
- surveying



Shipping Industry

PROJECTS

Construction and Geometric Verification of Opera's Ferrocement Canopy Panels, Stavros Niarchos Foundation Cultural Centre, Athens, Greece

- Creation of the 3D model of the panel
- Taking geometric information from the transverse and longitudinal sections at predetermined points
- Very high requirements of accuracy during the
- construction and checking of the panels – limit of 2mm
- Examination of the following data for geometric verification of each individual panel
- Distance between the ribs (vertical beams)
- Deviations of ribs axes
- Width of the ribs
- Distance between the beams
- Deviations of beams axes
- Width of the beams
- Flange thickness

Façade As-Built Survey at CRing – Doha, Qatar

- Low time of data acquisition comparatively to the classical methods
- Non-invasive method to collect data
- Low price of works
- Authentic, full and accurate 3D copy of reality that cannot be executed with other measurement means or method
- 2D and 3D documentation within the easy reach of engineers, structure designers and architects
- Production of 2D drawings or 3D models for refurbishment and restoration project, compatible with all CAD software.

Natural Gas Metering and Regulating Station – Takoradi, Ghana

- Industrial surveying, design and construction support
- As-built information as a basis for the mechanical
- engineering team
- As-built for retrofit plant design (natural gas)
- Construction administration support for all civil works needed for this project
- Coordination in drawings in civil and mechanical works.

Company's Aims

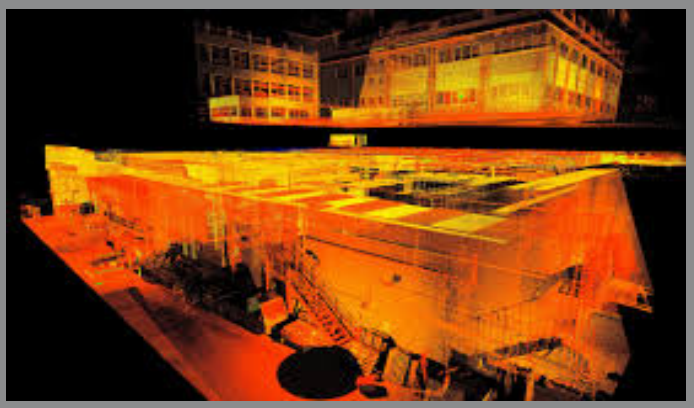
Provision of consistent and dependable quality services.
Project delivery on time and within budget.
Meeting the needs of our clients on project basis.

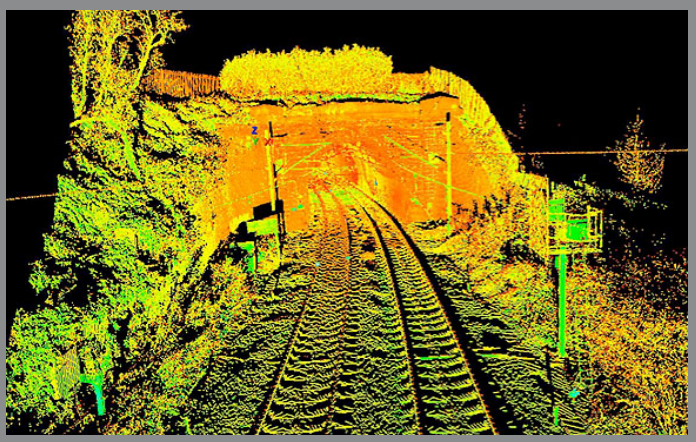
- Undertaking of the whole project organization.
- Participating in all stages of construction starting from the initial design untik the final operation.
- Coordination of designs studies.
- Offering expert consulting services throughout the project by incorporating special surveying applications into our services.
- Providing accurate and updated field data to all designers.
- Documentation of quantity surveys.
- Consulting on the financials, technical and operational requirements of each project.
- Working with the teams of subconstractors.
- Management of info & data flow between all of the involved parties.
- Performing all surveying works according to ISO standards.

Scan to BIM

WHAT IS SCAN TO BIM

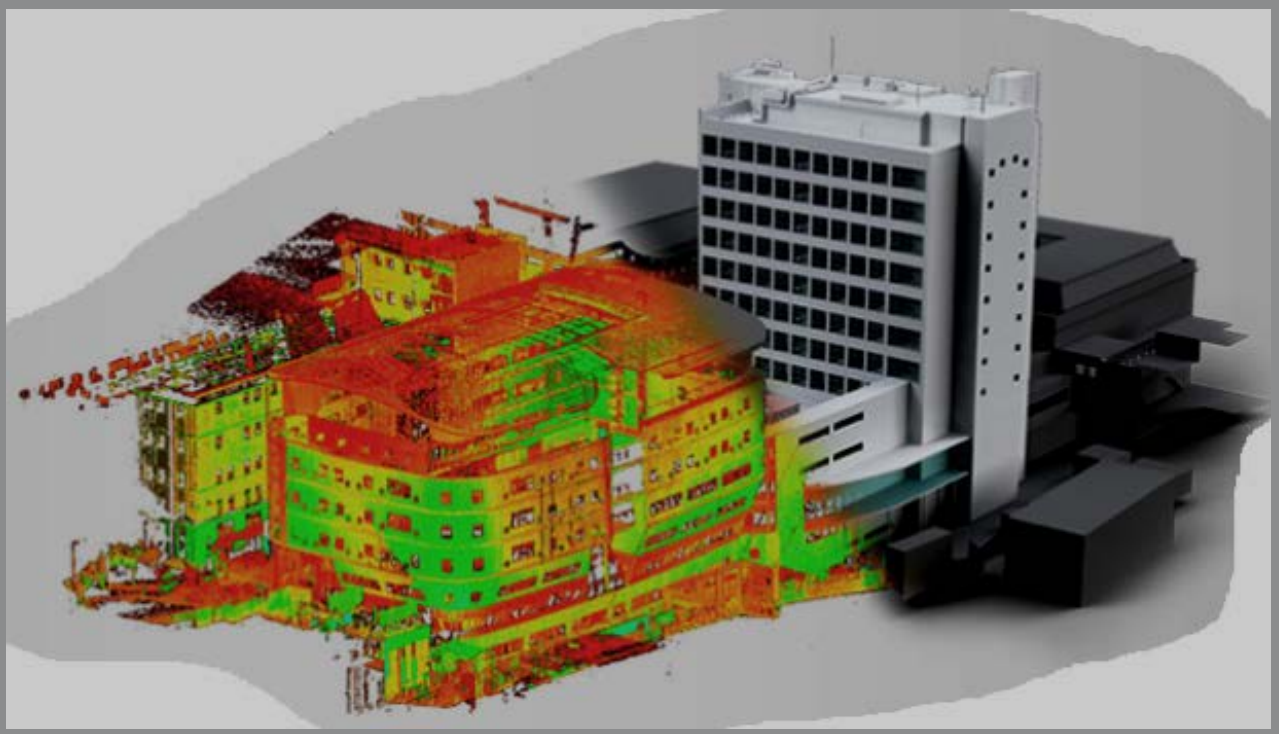
- Building Information Modeling (BIM) is the strategy for application of information technology to the building industry.
- Utilizing laser scan data to capture the as – built environment, allows faster more accurate 3D BIM model creation. Ideal for refurbishment or retro – fitting projects, scanning both external and internal builds for a high accuracy 3D survey from which the intelligent model is created.
- The application of building information modeling solutions results in higher quality work, greater speed and productivity, and lower costs for building industry professionals in the design, construction, and operation of buildings.





WHY SCAN TO BIM

- The implementation of BIM is fundamentally changing the way the construction industry works. Scan to BIM can provide a faster, more accurate, more comprehensive method for capturing survey data critical for refurbishment or retrofitting BIM projects.



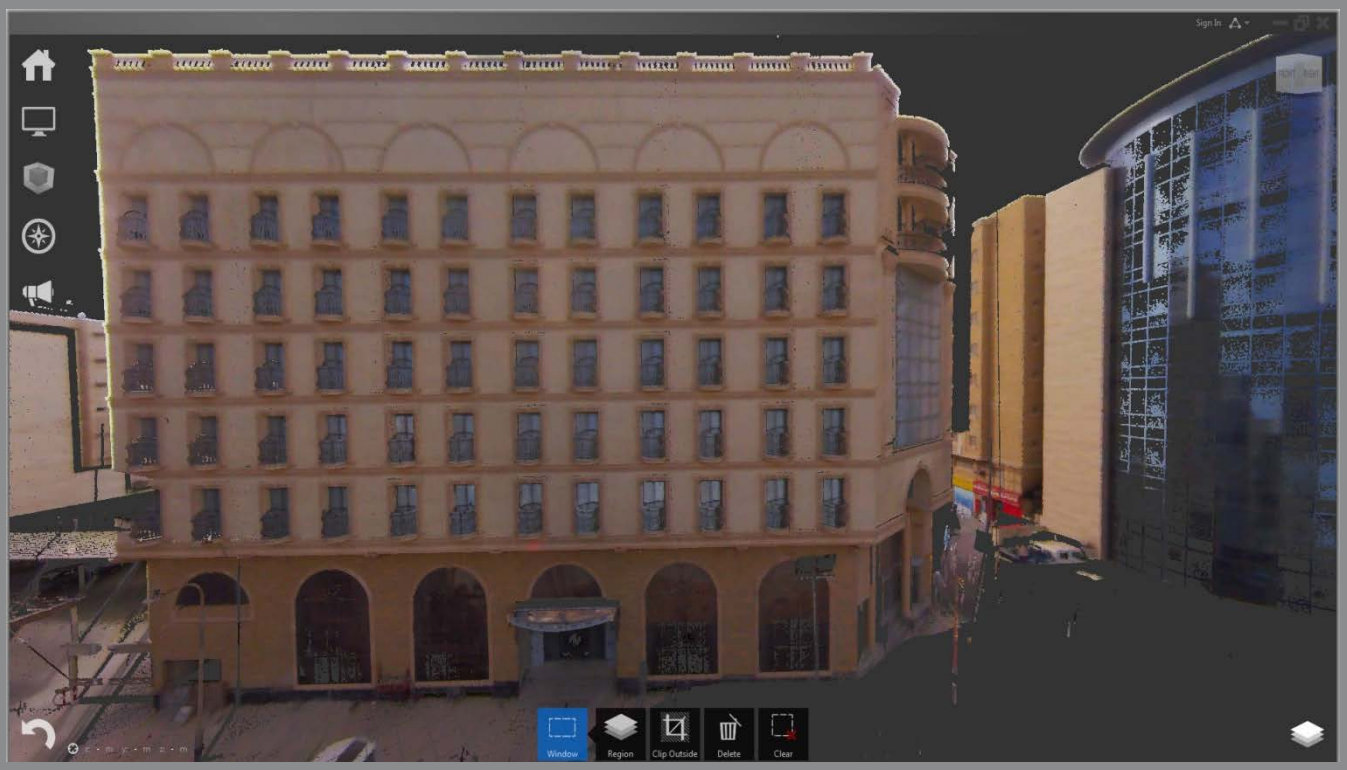
BENEFITS

- Improved – communication, collaboration & transparency
- Lower – overall costs on build
- Reliable – quality checked data (model against scan)
- Faster – decision making, implementation of project alterations
- Less – time on site, missed data, rework, construction clashes
- Fewer – errors & costly mistakes, plan virtually
- Phased – scan & model parts of the project when & if required
- Better – sustainability, using BIM throughout the building's life.
- 'What if' – plans & sequences can be optimized virtually

DELIVERABLES

- 3D laser scan point cloud
- Leica TruView dataset – accessed via web browser
- 3D intelligent BIM model
- Rendered visualizations & flythroughs
- Topographical survey of surrounding area
- 2D floor plans, elevations & sections (from BIM model)
- 3D PDFs – accessed via Adobe's free Reader software

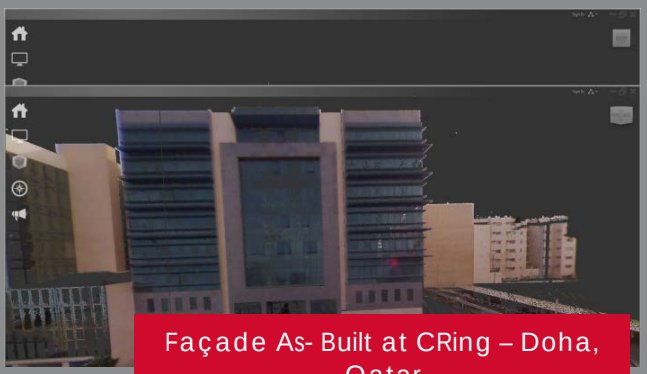
COMPANY'S EXPERIENCE – BUILDING APPLICATIONS



- Façade As-Built Survey at CRing – Doha, Qatar

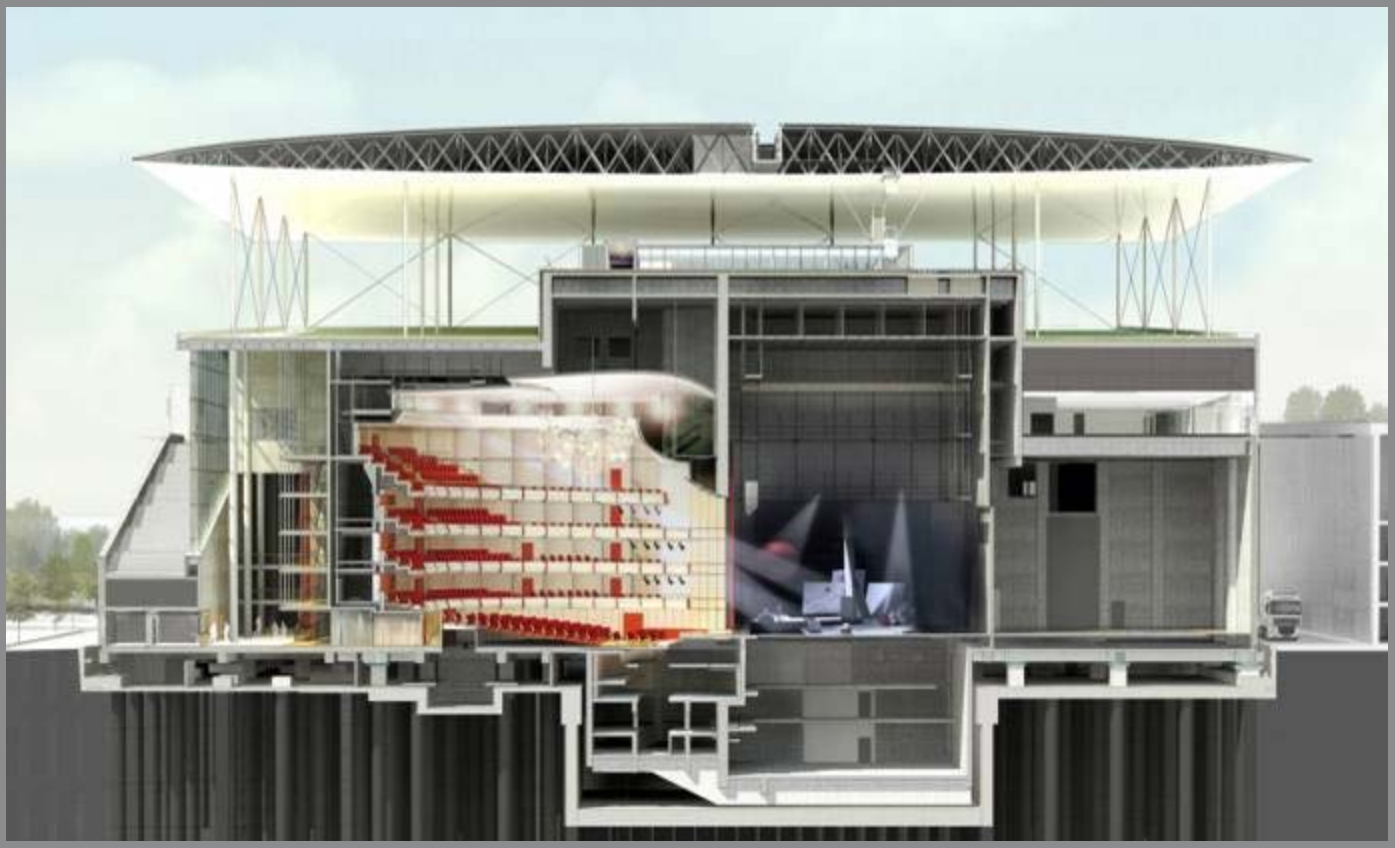
- Low time of data acquisition comparing to classical methods
- Non-invasive method for collecting data
- Optimum cost of works
- Authentic, full and accurate 3D copy of reality
- 2D and 3D documentation for engineers, structure designers, architects.
- Production of 2D drawings or 3D models for refurbishment and restoration project, compatible with all CAD software.
- Structural details – complex documentation based on the accuracy and large volume of data
- Reconstruction of complex architectural elements
- Internal building survey for floor plans
- 3D urban modeling for planning studies
- Detailed architectural scanning for preservation
- BIM model creation

Façade As-Built Survey at CRing – Doha, Qatar



Façade As- Built at CRing – Doha, Qatar

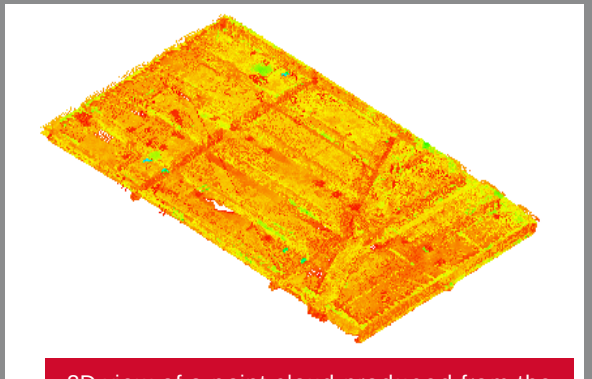
COMPANY'S EXPERIENCE – INDUSTRIAL APPLICATIONS



- Construction and Geometric Verification of Opera' s Ferrocement Canopy Panels, Stavros Niarchos Foundation Cultural Center

  - Concrete panel's 3D model creation.
  - Measurements of the geometric information from the transverse and longitudinal sections at predetermined points.
  - High accuracy requirements for the construction and control of the panels – limit of 2mm
  - Each panel's geometrical verification of the following parameters :
    - Distance between the ribs (vertical beams)
    - Deviations of ribs axes
    - Width of the ribs
    - Distance between the beams
    - Deviations of beams axes
    - Width of the beams
    - Flange thickness

A typical ferrocement panel



3D view of a point cloud produced from the scanning session

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