



3D Building Documentation

3D Laser Scanning – Scan to CAD – Scan to BIM

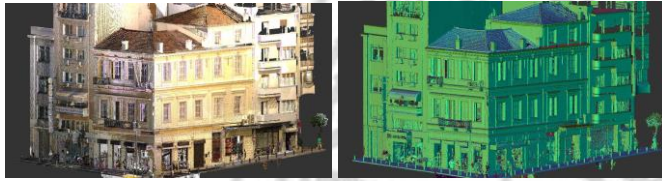
Company profile

ASTROLABE ENGINEERING was founded in December 2002 with headquarters in Athens, Greece. The main objectives of the company are the provision of high-quality Consulting Engineering services and the development of specialized IT applications, for Public Bodies and Organizations, Local Government Organizations, as well as Private Bodies and companies, at National and International level.

The company is registered in the National Registry of Consulting Engineers of the Greek Ministry of Infrastructure and Transport, holding a 5th grade Degree in category 16 (Topography-Land surveying), 4th grade in category 10 (Transportation design) and 2nd grade in category 02 (Urban Planning). It is also a member of the Technical Chamber of Greece (TEE), the Hellenic Association of Consulting Firms (HELLASCO) and the Association of Geoinformatics and Cadastral Companies (SEGEK).

A main company priority is the continuous effort for the integration of new technologies and methods in the production process, to continuously improve the quality of the provided services, as well as to make customer service faster and complete. A wide range of innovative methodologies and techniques has been incorporated into the company's know-how over time, giving it a leading position in important market segments.

The main areas of activity of **ASTROLABE ENGINEERING** are **Land Surveying**, Transportation Design, Pipeline Engineering, Cadastral Studies, Photogrammetry, **3D Laser Scanning** and Geographic Information Systems (G.I.S.).

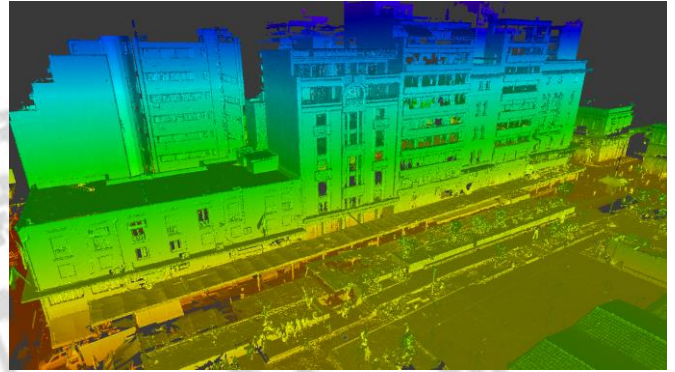


ASTROLABE ENGINEERING specializes in **3D Laser Scanning applications** in Greece and Worldwide since 2005. In combination with our expertise, we use various scanning systems and processing software, covering any field of application, from very short to very long range, at accuracy starting from a few microns, using static or mobile workflows. Thus, we can provide the best possible data capture solutions and post-processing scenarios for any 3D survey and modeling requirement in various market sectors:

- Large infrastructure projects (bridges, tunnels, dams, highways, etc)
- Mines, quarries, earthworks
- **Architecture**
- Archaeology and Cultural Heritage
- Industrial, mechanical and marine applications

- Geological and Geotechnical applications
- Urban Planning and City Modeling
- Forensic reconstruction, accident and disaster site documentation
- Cinematic visual effects, virtual reality, etc.

The company has performed 3D architectural documentation surveys in **more than 100 buildings and building complexes** in Greece and Worldwide. These include hospitals, hotel facilities, multi-storey buildings, traditional and preservable buildings, etc. The projects involved complete internal and external 3D surveys of buildings / complexes and the production of architectural - structural drawings (floor plans, elevations, sections), BIM modeling, etc.



More information about the company and its activities and experience is available at www.astrolabe.gr, while video samples of our projects are available for viewing on our YouTube channel: www.youtube.com/c/AstrolabeEngineering.

Methodology

3D laser scanning is the **most efficient technique** for fast, complete, reliable and accurate geometric and photographic documentation of objects of architectural interest (interior and exterior of buildings, facades, surrounding areas, etc.). The method **digitally captures and records** the building or space, as it is at the time of scanning, and transfers it to the computer (in the form of a three-dimensional colored pointcloud) for archiving and further processing, which is especially important for documenting and monitoring dynamically changing objects (e.g. buildings under construction or restoration or that suffer damages over time).

Based on **LIDAR** technology (**L**ight **D**etection **A**nd **R**anging), the method allows the detailed mapping of the overall form of three-dimensional objects, with a very fast collection of **metric and at the same time color - photographic information**. The data is collected as **evenly distributed 3D color points** with the desired density (resolution), all of which form a **pointcloud**.

The instruments used for this process are called **3D laser scanners** and can be considered as automated topographic geodetic total stations, but capable of measuring up to millions of points per second.

The three-dimensional mapping of building units with this technique, recording their as-built condition with completeness and accuracy, finds application in:

- Renovation of buildings
- Maintenance and restoration of buildings, monuments, temples, etc
- Redesign and completion of unfinished buildings
- Static structural adequacy building control
- Structural elements verticality and levelness control

- Maintenance and upgrade of Hotel facilities, Hospitals, Industrial buildings, etc
- Building permits – Legalization of unauthorized constructions
- Construction monitoring in comparison to the design

Benefits

The most important **advantages** of applying 3D laser scanning in architectural documentation surveys are:

- Fast and complete recording of 3D geometry in the field with simultaneous collection of color information (RGB pointclouds and panoramic images).
- Transfer of the total object to the computer minimizing the need for further checks and visits.
- Incomparable density and detail, especially suitable for complex and irregular objects of any size and morphology.
- Production of highly reliable products at low cost, increasing the productivity of the overall project.
- High measuring accuracy (millimeter order) and reliability of final products due to the completeness of the recording.
- Method applicable on inaccessible objects (non-contact method).
- Method applicable in conditions with poor or no lighting.

Equipment

The continuous investment in the use of cutting-edge technologies and the acquisition of high-level know-how has been a key priority of our company since its establishment. In this context, we use various scanning systems or combinations thereof with topographic or photogrammetric methods, drones / UAVs, etc., depending on the application, size and shape of the object, the desired accuracy, the required range, etc.



More specifically, for objects of architectural interest, the scanners available and used by the company are:

- **ARTEC EVA 3D handheld optical scanner** for small objects, architectural elements, statues, details, etc., with accuracy up to 0.1 mm, range from 40 cm to 1 m, data recording speed up to 288,000 points / sec and simultaneous texture / color recording 24bpp.
- **3 FARO Focus laser scanners (X130 and M70)** for interior and exterior of buildings or their surrounding area, with an accuracy of 2-3 mm, range up to 130 m, speed up to 976,000 points / sec and built-in color panoramic camera with total resolution up to 70 Mpixels.
- **OPTECH Polaris laser scanner** for larger spaces or for cases where, due to accessibility or visibility conditions, a longer range is required (scanning range up to 2000 m with an accuracy of 5 mm, speed 500,000 points / sec and built-in digital camera with a total resolution of up to 80 Mpixels).
- **OPTECH Maverick Mobile Mapping System** for zone and corridor mapping. It is mounted on a backpack or moving vehicle and combines a 100 m range laser scanner of 2 cm accuracy and a speed of 700,000 points / sec with a 30 MPixels panoramic digital camera and a GNSS / IMU system for positioning and orientation. It is also suitable for mobile indoor surveys with Simultaneous Localization and Mapping (SLAM) technology.

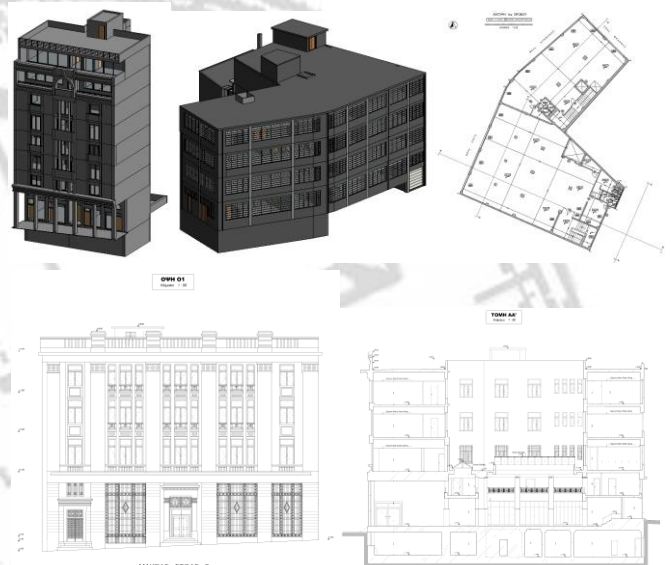
For the field work, together with the use of the above equipment, we deploy in Greece and Worldwide multiple field crews of specialized in 3D laser scanning surveying engineers, experienced in architectural documentation

field works. We thus provide **immediate availability and mobilization capability** to serve your needs.

Deliverables

Suggested digital deliverables include:

1. **Unified colored 3D pointcloud** in combination with documentation through panoramic images and the ability to interactively browse and extract measurements. It is delivered in Autodesk ReCap (RCP) format, suitable for importing in all Autodesk applications (AutoCAD, Revit, etc).
2. **Orthoimages of elevations, floor plans, sections** at any position. They are delivered as images placed in digital DWG files, allowing the direct digitization to generate the respective architectural drawings.
3. **2D architectural as-built CAD drawings** (elevations, floor plans, sections) in DWG / DXF format.
4. **Inspection and deviation maps** to check for distortions (e.g. deviation from a horizontal or vertical plane).
5. **3D CAD or BIM models** in Autodesk Revit format.
6. **Presentation and virtual reality products** (videos, photorealistic VRML models, virtual tours).



Cooperation options

The range of deliverables allows for flexible ways of cooperating with the creation of specialized packages of deliverables according to your requirements.

For example, a form of cooperation may include the execution of 3D laser scanning survey and the rapid delivery from our side of comprehensible and easily usable products (deliverables 1 and 2 above), so that the final CAD and design work is done by the client. The obvious advantages are the cost reduction, the utilization of the client's staff and the generation of as-built architectural drawings based on his needs, experience and scientific judgment.

Of course, our company also undertakes the complete generation of all the deliverables by specialized architects and modelers, if required. We are at your disposal to understand your needs and reach **the way of cooperation that better suits your requirements**.

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