



## Auscultation of the Mosque Hassan II in Morocco by lasergrammetry

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### *Summary*

- Presentation of Hassan II Mosque
- Mission objective
- Lasergrammetry property
- products



## Presentation of Hassan II Mosque

- Opened August 30, 1993, Hassan II Mosque remains a masterpiece of architectural symbol of the great Casablanca. It is the 2nd largest mosque in the world after Mecca (Saudi Arabia).
- The mosque is built on a platform erected at 2 / 3 of the ocean, giving the monument a strategic location and a wonderful view.
- Since opening to the public for its preservation and maintenance were performed by the urban agency in Casablanca. The latter has continued to deploy all the human, financial and physical resources to ensure the proper management and maintenance of this cultural monument multifaceted.



## Presentation of Hassan II Mosque

- For this purpose the agency launched, in two parts, a project diagnosis and establishment of a surveillance system covering the facades of the Hassan II mosque.
- The first phase involves the implementation of a testing program for the monitoring and maintenance of facades and marble cladding of the Hassan II Mosque, the mission was entrusted to a laboratory for study and buildings diagnosis, structures and heritages.

Mission objective

The second mission involves the performance of the census services Scanner 3D reconstruction in digital coating travertine façade of the minaret and prayer room and finally the establishment of a geographic information system which will enable monitor states of plates and a map of all the Mosque Hassan II degradations.

Mission objective

Seen the importance of the architectural statements for big precision in every project of renovation or rehabilitation of building and convinced by the contribution high technologies of TLS , the urban agency of Casablanca imposed the survey by laser scanner for the establishment of plans of facades.

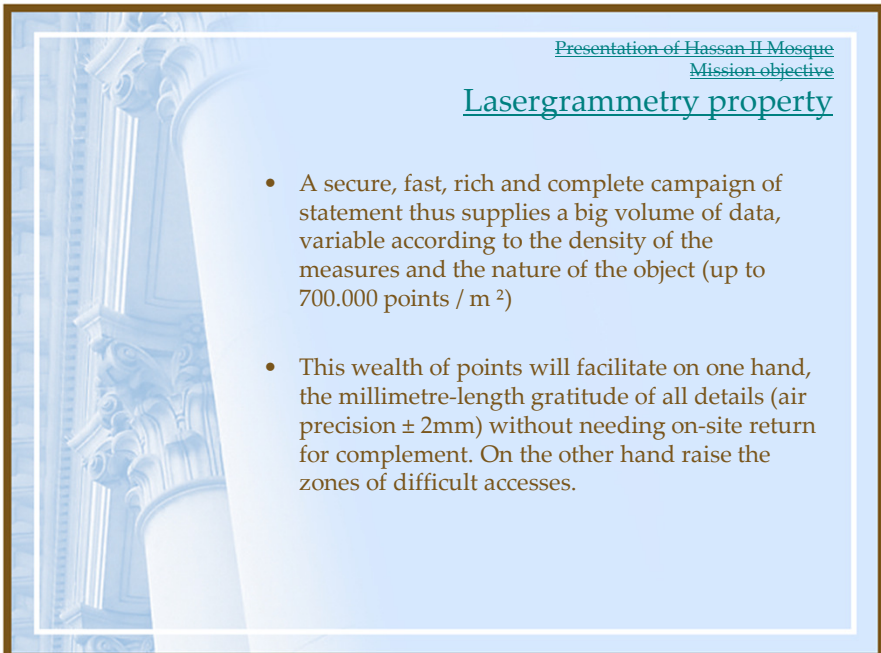
This mission was confided to ETAFAT topographic company

### Mission objective

- The 3D technology remains the future of the visualization; it represents an integral part of the engineering for the evaluation in the field of the architecture and the construction cultural heritage today.
- The use of the scanning 3D laser opens new horizons for the humanity in domains such as the conservation of invaluable historic and cultural objects for our descendants and allows assuring the general availability of world cultural heritage which would help in the cultural development between the citizens of all the countries.

### Lasergrammetry property

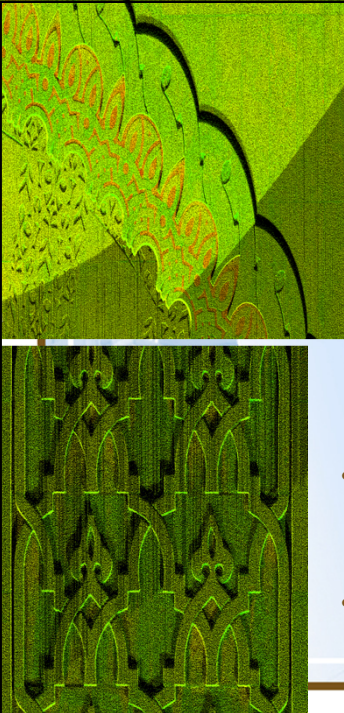
- The scanning laser-scanner (lasergrammetry) allows to measure buildings, without contact, with very high-density one of information. The clouds of 3D points, directly stemming from the measure, are especially very precise and very coherent.
- The point's clouds are the three-dimensional points measured by the sensor on the surface of the spicy object, every point being referenced at least by its coordinates (xyz). Further to the surveying, every point cloud is going to correspond to a recording and not to a logical division of the object.



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## Lasergrammetry property

- A secure, fast, rich and complete campaign of statement thus supplies a big volume of data, variable according to the density of the measures and the nature of the object (up to 700.000 points / m<sup>2</sup>)
- This wealth of points will facilitate on one hand, the millimetre-length gratitude of all details (air precision ± 2mm) without needing on-site return for complement. On the other hand raise the zones of difficult accesses.



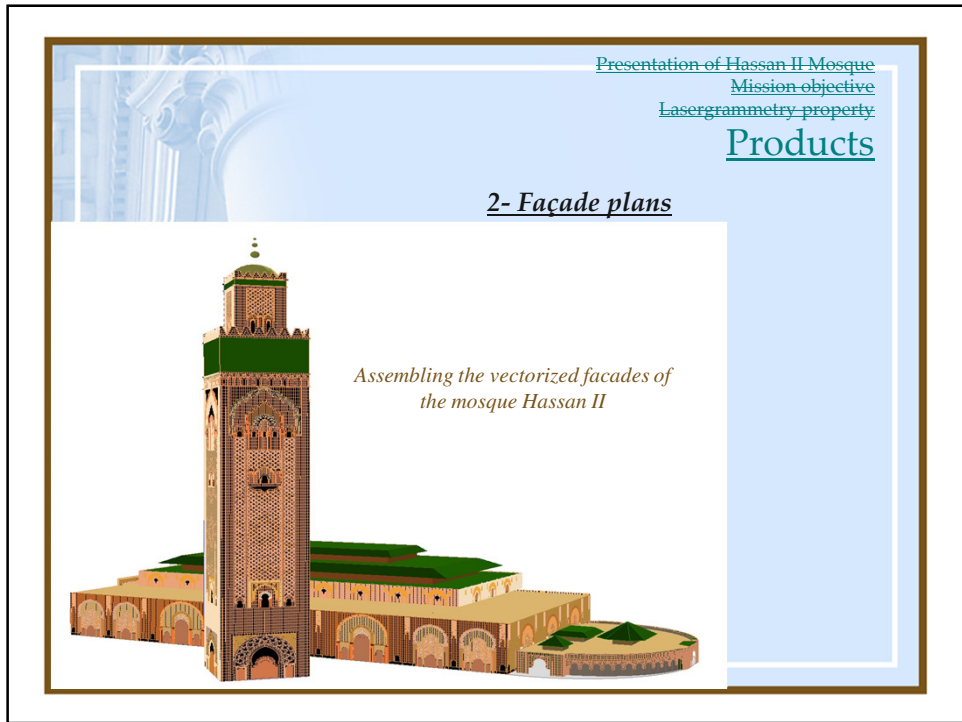
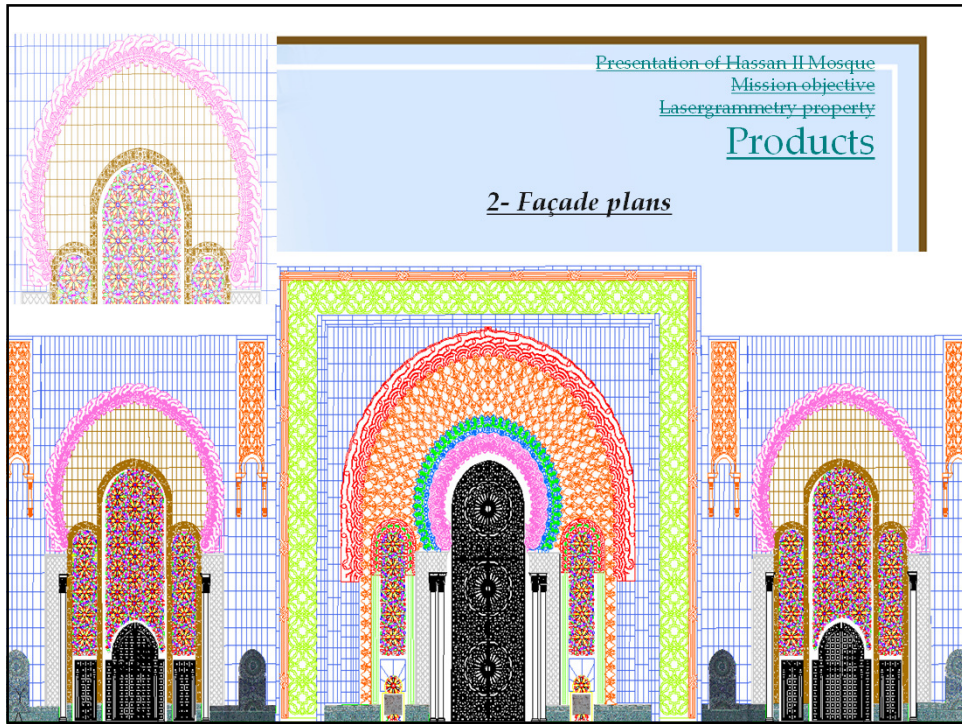
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## Products

### *1- Points cloud*

The analysis of deformation was realized from the point's cloud. The strong density of captured information allowed mapping, in a very visual way, the distances to the plan of marble plates and quite other buildings. This representation allows understanding quickly the deformations undergone by facades.

- The Lasergrammetry allocates to points cloud, a value function of the values RGB object reflectivity via an integrated digital camera.
- The referenced points cloud represented the base to establish the facade plans at real time.





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## Products



- On the other hand, a mobile GIS was developed to records of field plates on the laboratory study building. Indeed, it was to establish an application to collect and edit data directly on the ground.

**Thank you for your  
Atteention**