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Department of
Cartographic Engineering

*Postgraduate Course in Geodetic Sciences
Technology and Geoinformation*




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Laser Scanner in Works of Art and Historical Monuments Monitoring


8th FIG REGIONAL CONFERENCE



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- INTRODUCTION
- OBJECTIVES
- OPERATION WITH LASER SCANNER
- PROCESSING TERRESTRIAL LASER SCANNER IN DESIGN OF ARCHITECTURE
- APPLICATIONS OF LASER SCANNER IN PROJECTS OF ARCHITECTURE
- CONCLUSIONS

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1. INTRODUCTION




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- In order to monitor and maintain the identity of monuments and historical heritage of a region and thus preserve their cultural development, the three-dimensional models represent an alternative precise of monitoring and recording, which allow viewing of works of art with great detail
- Among the ways to generate three-dimensional models can cite the 3D laser scanning

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2. OBJECTIVES




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General Objectives

Submit designs of laser scanning survey applied to works of art and historical monuments aiming to demonstrate the relevance of the technique for making decisions on conservation, preservation and restoration of the same, since the products generated by the system are consistent have a millimetric precision consistent with architecture and can be generated quickly.


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2. OBJECTIVES




Specific Objectives

- Explain the operation and processing of laser scanner for architectural projects;
- Show applications of the importance of laser scanning for architecture;
- Propose a tool that contributes to agility in conservation projects, conservation and restoration of works of art and historical monuments.

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3. OPERATION WITH LASER SCANNER



The sensor measures both the intensity of the return signal as well as the time elapsed between emission and reception of the return, which is used to calculate the distance sensor-object, whereas the laser pulse propagates at the speed of light.

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3. OPERATION WITH LASER SCANNER





Point Cloud Church of St. Francis (Salvador-BA)
Source: Heritage and New Media: Scanning and GIS - Vol 3, No. 1 (2009)


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4. PROCESSING TERRESTRIAL LASER SCANNER IN DESIGN OF ARCHITECTURE




- In possession of the point cloud acquired by laser scanner, then can be performed manually the cleaning all the unwanted points and not belonging to the facade or artwork.
- Furthermore, each point can be linked to a radiation which corresponds to a value between 0 (zero) and 1 (one) and zero for darker materials and one (1) to the lighter.

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5. APPLICATIONS OF LASER SCANNER IN PROJECTS OF ARCHITECTURE




5.1. Facade of the Palace of Quiñones de León


Paco de Quiñones de León Cloud of points gained by the Laser Scanner

Sources: Medina et al 2011

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5. APPLICATIONS OF LASER SCANNER IN PROJECTS OF ARCHITECTURE



- 5.1. Facade of the Palace of Quiñones de León


Result of cleaning performed on the point cloud
Source: Medina, 2011

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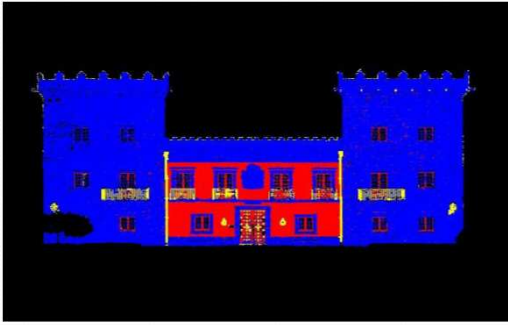
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5. APPLICATIONS OF LASER SCANNER IN PROJECTS OF ARCHITECTURE



5.1. Facade of the Palace of Quiñones de León



Facade classified (in blue granite, white wall in red and yellow iron)
Source: Medina, 2011

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5.2. Castle Neuschwanstein



Interior Castle Neuschwanstein
SOURCE: ABMAYR et al, 2004


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DECart

5.3. Chapel of "Neubrueck"



Point Cloud and 3D model of the Chapel "Neubrueck"
SOURCE: SCHULZ & INGENSAND, 2004

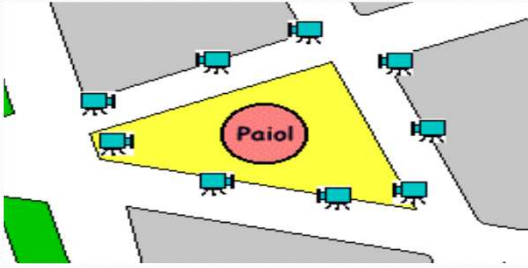
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5. APPLICATIONS OF LASER SCANNER IN PROJECTS OF ARCHITECTURE

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5.4. Theater of Paiol



Sketch stations acquisition
Source: Centeno, 2007

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5.4. Theater of Paiol



Facade of the western theater Paiol
Source: Centeno, 2007

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5. APPLICATIONS OF LASER SCANNER IN PROJECTS OF ARCHITECTURE



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5.4. Theater of Paiol



Facade of the eastern theater Paiol
Source: Centeno, 2007

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6. CONCLUSIONS

The laser scanner is a valuable tool in monitoring of works of art and historical monuments. Not just for the advantage of the time of analysis and processing, but also for the richness of details, as this system is able to capture topographic information in inaccessible places like ceilings and gallery irregular in the case of monuments, or even in places difficult to visualize, in case of sculptures and / or works of art.

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DeCart

THE END

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