Ultrasonic Tomography of the Diana the Huntress statue (Salinas Museum, Palermo)

P. Capizzi ([*, a]), A. Carollo ([a]), M.V. Majani ([a]), A. Canzoneri ([a]), R. Martorana ([a]), F. Fazzio ([b])

([a]) Department of Earth and Marine Sciences (DiSTeM), University of Palermo, 90123 Palermo, Italy,
(b) Restorer, Freelance Researcher
* Presenting author

Email corresponding: patrizia.capizzi@unipa.it

A geophysical study on the "Diana the Huntress" marble statue, which has to be exposed in the Salinas Museum of Palermo, was performed to solve the conservation problems of the statue, both aesthetic and structural. The statue currently has a diffuse superficial blackening, probably due to an attack of the microflora, while structurally, the weight of the bust rests entirely on the central trunk. A 3D Ultrasonic Tomography [1-2] was performed on the statue to identify any anomalies due to structural defects of the material and possible internal support elements. A total of 357 measurements were acquired following the “transparency” technique after an accurate choice of several points at which transducers were located to be used as transmitters or receivers of the ultrasonic rays (Fig. 1a). The velocity model obtained was finally constrained to the scanner survey of the statue, allowing a 3D visualization of the model. The results of the ultrasonic survey showed an average velocity of about 3000 m/s, considered adequate for the properties of the marble. However several areas with low velocity values (less than 1500 m/s) were observed, which could indicate areas with poor mechanical resistance. Thanks to ultrasonic tomography it was possible to identify the structural weaknesses that confirm what was expected; therefore, the permanent exposure will take place through the use of support elements.

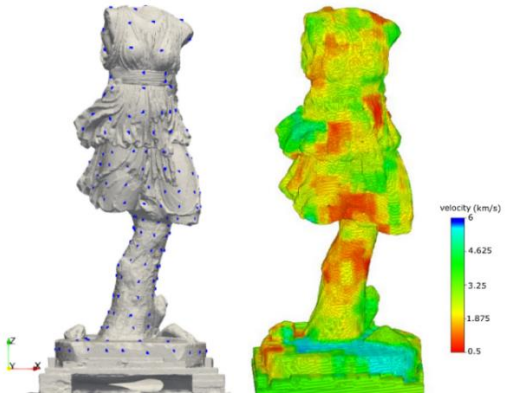

Figure 1. (a) The front view of the scanner survey of the statue, in blue the measurements; (b) 3D rendering of the velocity model.

References

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