



Nautech

YACHT, SUPERYACHT, TECHNOLOGIES AND DESIGN



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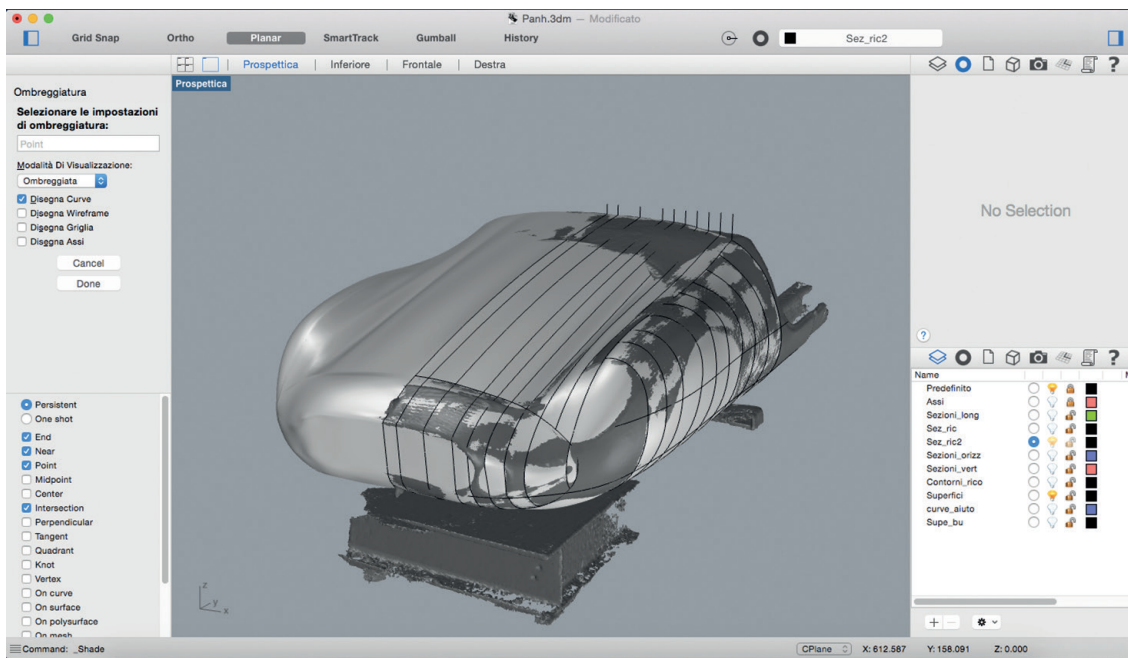
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The digital craftsman

TODAY, NAUTICAL SCIENCE SEES THE INVOLVEMENT OF EXTREMELY SOPHISTICATED TECHNOLOGIES AND INNOVATIVE MATERIALS IN THE CREATION OF TRUE DESIGN MASTERPIECES, IN WHICH EVERY DETAIL IS CAREFULLY DESIGNED AND REALIZED.

However, the handcrafted know-how preserved across generations still remains an unparalleled legacy, and the “manual doing”, still in the hands of the old shipwrights, risks being inexorably lost along with them. The knowledge of how to do things ‘as they once were’ is concentrated in the hands of those few craftsmen who have built their ability through years of practice and experience; as it happens, for instance, in the restoration of classic cars. They are not mere coachbuilders, but rather artists those who, with their hands, are able to mould surfaces and patiently reconstruct unique masterpieces; in this field, too, there is the risk that knowledge of manual practice, not replaceable save by long years of workshop apprenticeship, will get lost. That is what gave birth to the idea of introducing digital techniques in the vintage car restoration process with the aim of improving the execution times, providing quality instruments to back up the processes, and especially gathering a precise documentation of the activities and the necessary steps to turn all of this into a repeatable process. Moreover, together with sophisticated digital acquisition systems, a few others with a decidedly low cost have also been tested, potentially useful in small-size realities without needing highly specialized staff, wherever a high level of precision does not prove necessary. Is it a process capable of being transferred to the nautical world as well? For some time now, laser scanners have replaced traditional systems of manual survey, and enabled the digital acquisition of forms with extensive precision and amount of geometric information. The laser light systems are codified on the basis of the characteristics of the utilized sensor, which might be set around optical triangulation or time of flight. Those set around optical triangulation enable many hundreds of

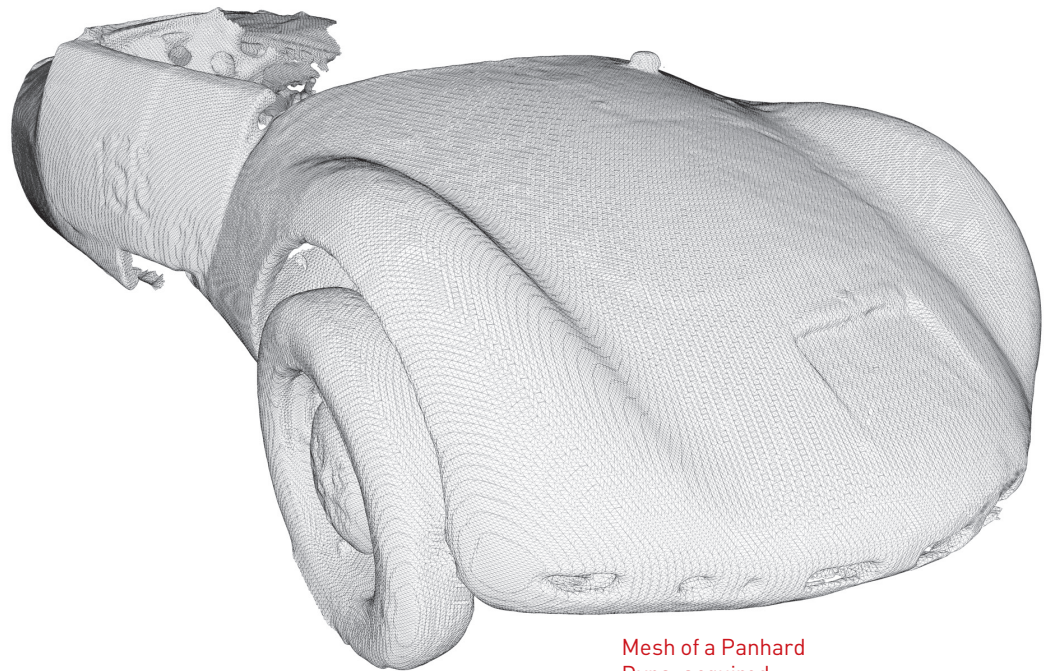
thousands of points to be surveyed within a few seconds, with an accuracy of 25 micro-metres and tenth of a millimetre sampling time on small surfaces; the time of flight systems have instead a lower precision and are rather used within an architectural context, thanks to their capacity of acquiring vast portions with a single shot – the acquired area with just a cursory look – and thereby reducing possible alignment errors. We then have the passive systems, which make use of photogrammetric techniques through analogue or digital cameras. As regards the latter, codified targets are placed on the surfaces to be surveyed, which targets – acquired by photographic images and suitably elaborated by specific software – succeed in returning the position within the three-dimensional space and describing the surfaces. Metric and semi-metric cameras enhance the precision of the acquired data as much as a hundred times more compared to ordinary commercial cameras, but the cost is quite high. Accordingly, given the wide range of available tools, it is essential to question the physical characteristics of the object, the purpose of the survey and the precision required in order for us to assess whether the investment on the instruments and on the data elaboration process results in a positive cost/benefit ratio in terms of productive process. The totality of three-dimensional survey and representation techniques, referred to by the term “Reverse Modelling”, is what currently enables the reconstruction of an existing object, hence of a hull, whether it be a mould, a master or a simple production sample. This process of transformation from the real to the digital consists of different phases: planning the scanning process, scanning the parts, alignment and merging of the scans, editing and data optimization. The final outcome is a di-



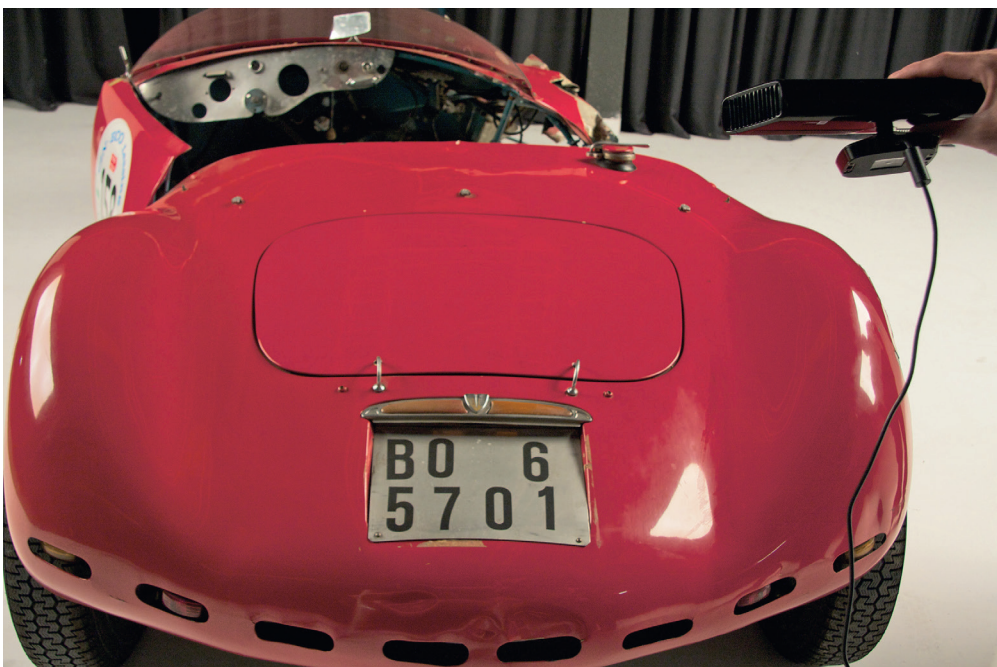
Reconstruction of the car body by sections created from the digital mode.

MAURO CECONELLO

Architect and Assistant Professor. Head of Design Labs System of the Design Department at Politecnico di Milano. He has been scientific coordinator of many research projects concerning 3D modeling and visualization in real-time and the valorization of culture through digital technologies and interaction tools.



Mesh of a Panhard Dyna, acquired with Microsoft Kinect.



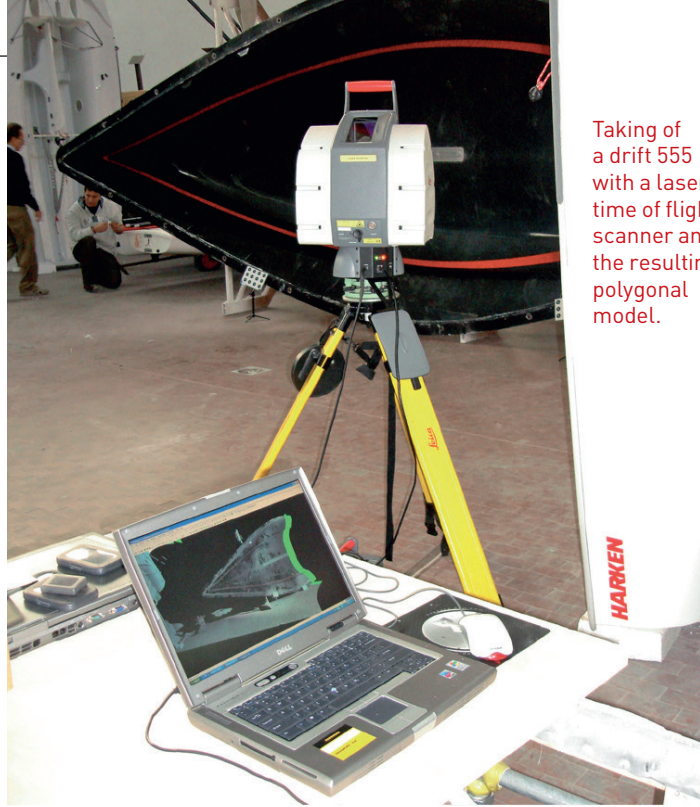
Acquisition of a Panhard Dyna with Microsoft Kinect.

TECHNOLOGY

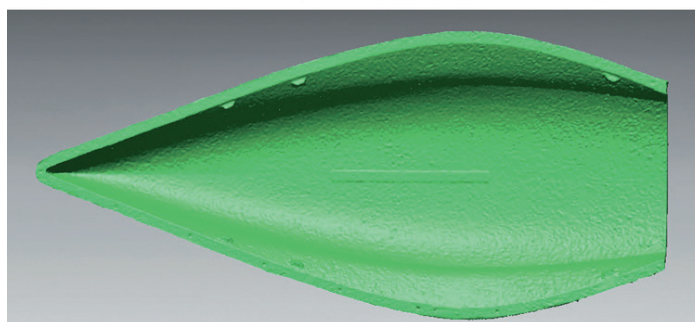
igital polygonal model, i.e. a dense network of polygons defined by the number of points engendered by the scan. A further passage envisages the transformation of the polygonal model into a mathematical model defined by free-form surfaces best adapted to the construction of continuous profiles and surfaces such as bodies and hulls. The handcrafted survey techniques allowed the survey of hulls by identifying the section profiles at suitable distances, measuring through a plumb line the distance at fixed quotas; this slow technique made it possible to broadly determine such elements of the construction plan as the shape of the keel and the number of frames, and then move on to detail the size of each structural element: the precision of the survey was obviously dependent on the operator's skill. Nowadays everything is different, fast, and precise. Clouds of thousands of points describe the surfaces and, suitably elaborated, return a perfect description of the acquired object.

From four wheels to the hull

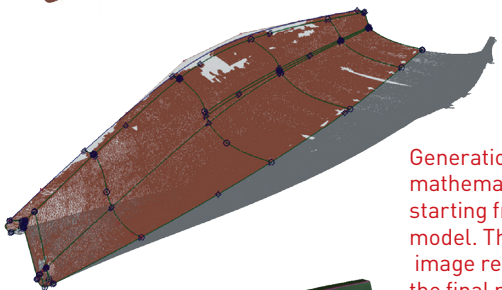
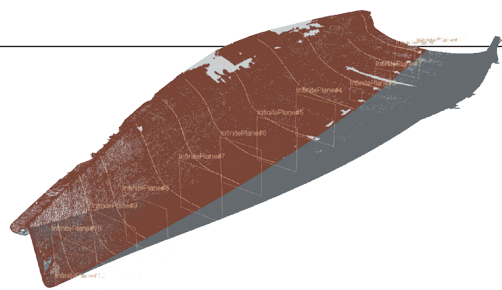
The idea of introducing digital techniques in support of handcrafted activities stemmed from a research project financed by Unioncamere Lombardia and the Lombardy Region carried out jointly with Laboratorio Lopane, a body shop specialized in restoration of vintage cars. The restoration of classic cars in Italy is a niche business that works mainly on custom-built cars, produced from the beginning of the 20th century till the end of the '70s by small artisanal/industrial laboratories. This kind of production was promoted by car industries that were used to propose, alongside the standard series, special models, produced in few units and addressed to selected customers, eager to own sports cars to access famous competitions or stylish ones for leisure. The main features of these cars were a sophisticated design, high level of technical quality, good aerodynamics together with a small number of samples produced, very rare and beautiful objects claimed by wealthy collectors worldwide. Most of these cars were hand made by very experienced craftsmen able to shape the bodywork starting from plan aluminium or steel sheets with the only help of wooden maquettes. The same competences are required today for the restoration, a time-consuming process that requires high skills improved through years of practice, and necessarily highly experienced technicians. Despite the restoration process relies on mature technologies and follows well defined steps, its artisanal nature and the highly specialized competences required make it a niche business whose survival is entrusted to keen and enthusiast apprentices, willing to spend years in their own training. Sometimes the damages to be solved are not limited to rusted chassis or bodywork but involve the entire car, as in case of accident, with no possibilities to deduce the original shape. More frequently the restorers must infer the shape of a damaged part through its specular one: a very simple task for digital tools such as a CAD but a very challenging and time consuming activity if handmade. The reconstruction of the bodywork is indeed the most complex operation; roles such as the shaper coachbuilder for instance requires the ability to shape a plane aluminium or steel sheet to match a damaged part, repeating the original curves, often with the only help of a handmade wooden maquette. During the first phase of the project – carried out by specialized staff, both in the phase of acquisition and in that of model op-



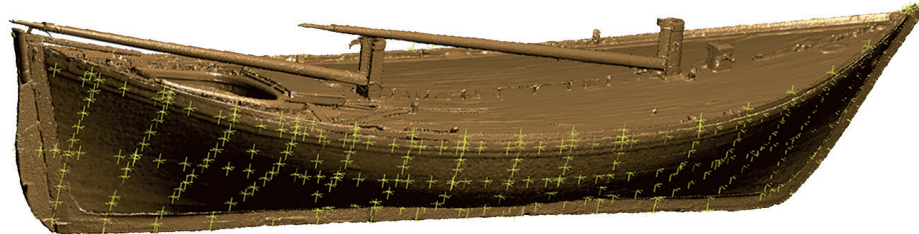
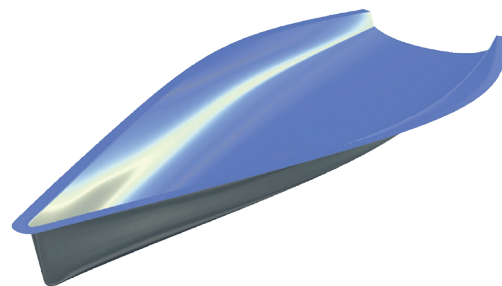
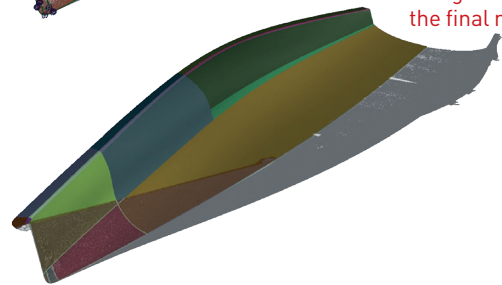
Taking of a drift 555 with a laser scanner and the resulting polygonal model.



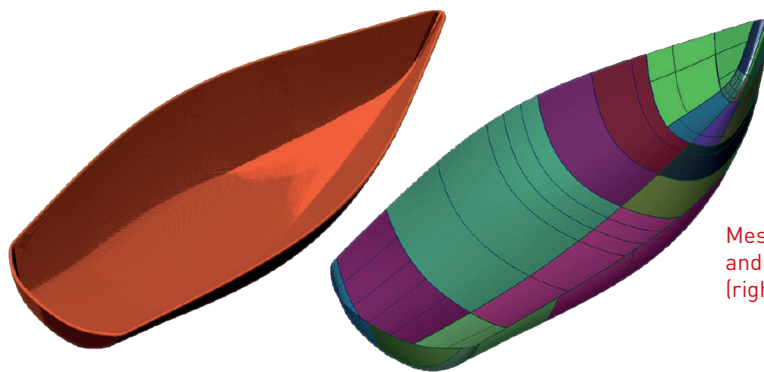
timization, at the Department of Design of Politecnico di Milano – use was made of the aforementioned active scanning techniques through triangulation laser scanner Minolta Vivid 910 on the aluminum body, on the bonnet and on the doors of an Alfa Romeo 1900 CSS Touring. The purpose was dual: both to acquire a digital replica as documentation and attestation of an artwork, and to recreate a material copy thereof, with a view to facilitating the preparation of components to be replaced in the event of damaged specimens. The digital model has enabled the implementation of metric measurements and even the ascertainment, between the right and the left side of the body, of a marked asymmetry, no doubt due to the manual sheet metal working. That was the case here. Thereafter, a low cost and extremely easy system was tested, given that the high level dimensional precision reached with a professional 3D laser scanner, and the connected costs, processing time and skills, are not necessary for the scope of the acquisition; in this field, the measurement of correctness of the form and the acceptable tolerances are in the order of a centimeter. We have accordingly decided to use a Kinect sensor, that has achieved fame on the market thanks to Microsoft's Xbox games by which players were capable of interacting through gestures without resorting to mouse or joystick; it consists of an infrared laser projector combined with a monochrome CMOS sensor that make it possible to continuously survey the movements of the body. Through Kinect software development kit (SDK) and a dedicated software, it is possible to survey an object in real time, quickly obtaining a polygo-



Generation of mathematical surfaces starting from a mesh model. The bottom image represent the final model.



Fotogrammetric acquisition of the "Leone di Caprera".



Mesh model (left) and Nurbs model (right) of a hull.

nal mesh eventually capable of being edited and optimized. The surfaces are read by the sensor – connected to a computer or to a tablet – by passing it through at a distance of about 50 centimeters from the object to be acquired, whilst you may visualize in real time on the screen the acquisition process in such a manner as to be able to verify the quality of the process and the result attained. The resulting model is by far less precise than the one obtained with a professional laser scanner but several factors make this equipment more suitable for the use in an artisanal workshop. In fact, the cost of the kit is very low and easily affordable by a small company as well as the skills required for the 3D acquisition that can be gained quickly; the time of processing is much shorter than that of a laser scanning and the resulting mesh meets the resolution definition necessary to fulfil the task. The procedure has been used in our lab on a Panhard Dyna 750 Special and the process has been entirely transferred to the Lopane Lab staff and followed over time by the Department of Design: from the use of the Kinect and the acquisition software to the use of the surface modelling software. The potential of this type of approach is still being studied, but the fact that the technology has been used more than once by the staff for the acquisition of other machines seems to be yielding a positive result. The said methodology may be transferred to the nautical field; the moderate cost of the equipment and the software is in the order of a few hundred Euros, which makes it sustainable for small productive realities as well. However, the technology is of course in constant development and offers ever new

possibilities to the market and to research. A technology that seems truly promising is Google Tango, a project announced already some years back, the developments of which have been presented this year at the Google I/O of San Francisco. Besides enabling multiple applications in gaming and in enlarged reality, this technology seems to propose interesting solutions in the real time survey of the surrounding space as well: a device fitted with vision processing, depth sensing and motion tracking makes it possible to move around and survey the surrounding space, and memorize it by mapping it through high-resolution images. All of that will be available in a Lenovo consumer smartphone towards the end of the year: it is not difficult to imagine the use of a similar device even in the field of low-cost three-dimensional acquisitions.

Bibliography

- Guidi G., Micoli L.L., Russo M. (2005). Boat 's hull modeling with low cost triangulation scanners, in: Beraldin, J.-A., El-Hakim, S.F., • Gruen, A., Walton, J.S. (Eds.), SPIE Videometrics VIII. SPIE, San Jose, CA, USA, pp. 28–39. doi:10.1117/12.587966
- Guidi G. (2009). Il rilievo nautico: dal filo a piombo all'acquisizione digitale tridimensionale, in: Yacht Design: Dal Concept Alla Rappresentazione, pp. 347–355, Tecniche Nuove.
- Ceconello M., Spallazzo D. (2013). Technological innovation and process innovation to support the restoration of classic cars. In Pignataro M., MO.DI.PHY. Modeling from digital to Physical. Innovation in design languages and project procedures, p. 278-287, Maggioli Editore.

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