

Providing Precision Measurements for Superyachts Using 3D Laser Scanners



Providing glass installations to the marine industry, AvMar Marine Glass prides itself on its high quality products and precision fit glass. By implementing the FARO Laser Scanner, AvMar has reduced their measurement time by 70%, and the precision measurements gathered with the scanner have allowed the company to ensure a perfect fit the first time.



In ports around the globe, a new breed of luxury has taken the stage in the form of large-scale private vessels known as superyachts. Exemplifying the best that engineering and design have to offer, these yachts display sleek frames built for both luxury and speed.

As one of the world's leading yacht glass companies, AvMar Marine Glass (www.avmarmarineglass.com) provides specialty glass installations worldwide for vessels ranging in size from sportfish to superyacht. From repair and refit to new construction projects, AvMar has provided unparalleled service and quality to the industry for over a decade.

Rick Simmons, president of AvMar, founded the company in 2000 because he recognized a need in the industry to utilize technological advances to improve the quality, speed and performance of glass installations.



Since its inception, the company has always utilized state-of-the-art technology to produce their glass products. Additionally, in keeping with the company's reputation for excellence, AvMar utilizes the highest quality, specially-formulated adhesives, and works with the most cutting-edge glass manufacturers to ensure the highest standards and worldwide certification for their products. Recent installation projects include, "The World is Not Enough" – the world's fastest superyacht, "Cakewalk" – the largest US-built yacht, and "Hemisphere" – the largest sailing cat in the world.

Problem

In a typical marine application, it can be a challenge to accurately fit glass windshields to a boat given the complex curvature of various designs. However, due to the sheer magnitude of the yachts AvMar works with, standard tools such as tape measures are not precise enough to collect the highly accurate dimensions and measurements needed to provide to the glass manufacturer. Without exact measurements, there is more room for error, and this can result in delays or faulty installations.



In one recent project, AvMar was tasked with providing glass for "Yas", a 141-meter superyacht built in Abu Dhabi. A former naval frigate for the Royal Netherlands Navy in the 1970s, the transformation of the decommissioned warship into one of the world's largest yachts was a massive undertaking. Over the course of the past three years, Yas has been gutted, welded and renovated, becoming nearly unrecognizable from her former framework.

However, the most striking part of the yacht's new design is the vast curved wall of glass that sweeps around the front section of the upper decks. Behind the glass, which darkens for privacy when an electric current is passed through, are the bridge and the owner's suite, complete with private terrace. Given the enormity of the task at hand in this new design, AvMar needed an alternative solution to quickly and accurately gather measurements of the window openings.

Solution

With Yas, as with any of the company's other projects, the team ran through a series of steps to evaluate the specific needs for the yacht – including a complete evaluation of yacht plans to review the design of the window

system, and ensuring compliance with classification and regulatory agencies.

The most technically difficult part of the Yas' construction was the more than 500 pieces of specially cast glass for its upper decks. As the largest curved glass project in the world, the glass is one of the main attractions of the yacht itself; however, in order to accurately fit the pieces of glass to the window openings, exact measurements were needed.

In the past, measurements would have to be taken using traditional tools such as tape measures. The measurements would then be used to create fiberglass molds or wood templates for the glass manufacturer to produce the appropriately sized glass. However, not only is this technique extremely time consuming, it is very difficult to capture highly accurate measurements.

In order to improve the overall efficiency of the measurement process, AvMar recently introduced next generation 3D digitizing technology to its toolbox by purchasing a FARO Laser Scanner Focus^{3D}. As the smallest, lightest 3D laser scanner on the market, the Focus^{3D} allows the company to take high-speed scans of window areas with an accuracy of $\pm 2\text{mm}$.

Utilizing the enhanced registration and remote functionality features, AvMar was able to quickly scan and process multiple data sets to provide precise measurements of the openings to AvMar's glass manufacturing partners.

Return on Investment

Through the implementation of the FARO Laser Scanner, AvMar has significantly reduced manufacturing time as data files are sent digitally without the need for foam or wood templates. The precision manufactured glass then fits better with smaller seams and installation is much easier.

Additionally, time spent by the measuring crew on the yacht is reduced by more than 70%, and measurements taken are accurate to $\pm 2\text{mm}$. The high level of accuracy allows for a precision fit installation the first time, saving the company thousands of dollars in materials and rework. The digital measurements can also be stored and used for later reproductions, without the need to re-measure the area.

The high degree of accuracy found in the FARO Laser Scanner allows AvMar to offer a five-year warranty against leaks and bond failure; an incentive that no one else in the industry offers. "No one in our industry is utilizing this type of technology today," says Simmons. "The power of this laser scanner is incredible. It can digitally 3D scan a 120-meter circular area with a high degree of accuracy!"

