APPLICATION NOTE / **MARINE / YACHTING**

3D LASER SCANNING FOR EXTRACTION OF NAVAL LINES

Overview

The main scope of this project was the 3D Scanning of the external hull of a 50 meters yacht for the extraction of naval lines. Our team performed measurements using the terrestrial laser scanner Leica RTC360 with relevant accessories. In the office, we used the dense point clouds to produce as-built sections of the yacht.

Challenges

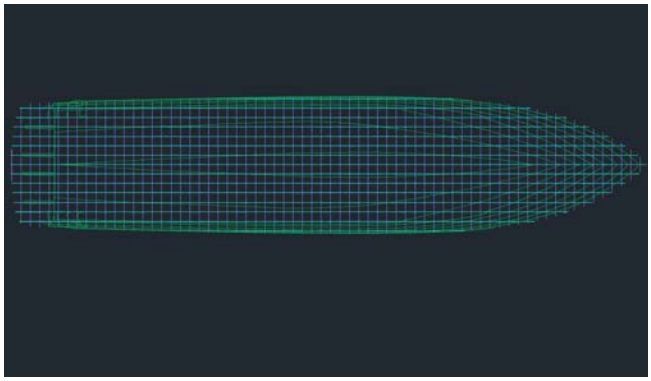
- Complex geometries and details
- Outdoor fieldwork - weather conditions

Benefits

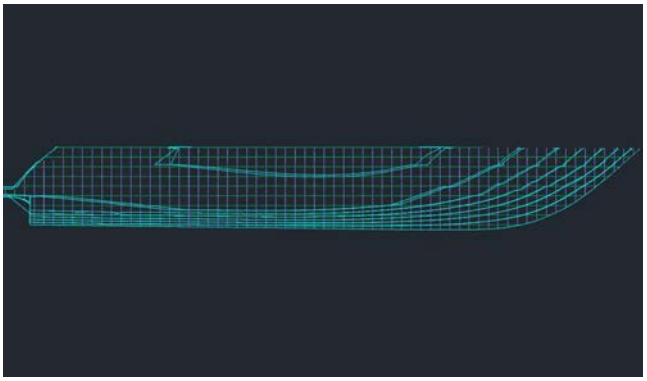
- Time-saving
- Increased productivity
- High accuracy
- Cost reduction

LEICA RTC360 3D LASER SCANNER

The Leica RTC360 3D reality capture solution empowers users to document and capture their environments in 3D, improving efficiency and productivity in the field and in the office through fast, simple-to-use, accurate, and portable hardware and software. The RTC360 3D laser scanner is the solution for professionals to manage project complexities with accurate and reliable 3D representations and discover the possibilities of any site.



Sections



Waterlines

Methodology

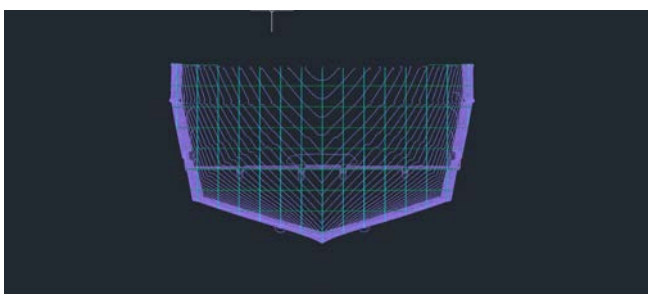
Terrestrial Laser Scanner technology was our approach combined with other classic geodetic techniques as the most suitable methodology to capture every hull detail. The whole measurement procedure lasted one (1) day. Before the scanning procedure, our team defines:

- the proper route of scanning setups
- the resolution
- the quality levels
- the production of final deliverables

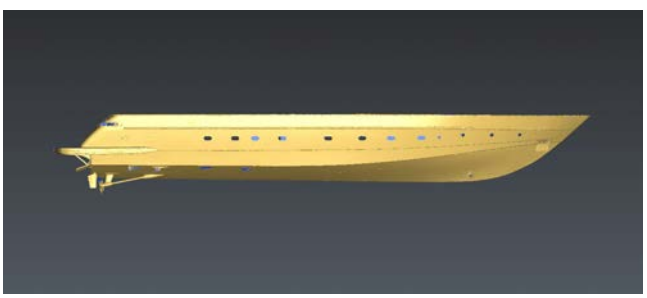
In this case, our engineers used a Leica RTC360 laser scanner with relevant black & white (HDS) targets. The external hull and the areas of interest on the main and sun deck were covered through 60 laser scanner setups. Leica Cyclone Platform Software was used for registration and other point cloud processing. All point clouds were registered and cleaned from irrelevant objects on Leica Cyclone Software.

For registration purposes, there were used cloud and target constraints. The mean absolute error for all registrations was 2 mm, and the max constraint error vector was 8 mm. All scan setups were registered into one final scan dataset using cloud and target constraints. After the registration process and visual inspections, point clouds were joined together to form one unified point cloud, which was aligned to the best approximate ship coordinate system according to the instructions of the project engineer.

After defining an approximate coordinate system and the alignment of the point cloud, our team created a mesh from the aligned point cloud utilizing Leica 3DR software. The 3D unstructured mesh was inspected for topological errors. From the 3D mesh, naval lines e.g. sections, buttocks and waterlines, were extracted (per 0.5m) and finally delivered in CAD format (.dxf, .dwg).



Buttocks



3D mesh inside Leica Cyclone 3DR

Instrumentation / software

Leica RTC 360 Laser Scanner
Leica Cyclone Field 360
Leica Cyclone / Cyclone Register 360
Leica Cyclone 3DR

Deliverables

Naval lines (Sections, Buttocks, Waterlines) in CAD format
3D Mesh model