RINA Case Study:

Luxury 42m Yacht Digital Twin

Case Study - 42m Yacht Digital Twin

Name of project:

42m Luxuary Yacht - Digital Twin.

Start and end dates:

28 June – 30 September 2023

What was the scope of the project and what was it about?

An Italian yacht builder approached RINA with regards to creating a 'Digital Twin' or 'Virtual Tour' (VT) of one of their luxuary 42meter yachts. This yacht is within RINA class and is supported shoreside by a management company working as Designated Person Ashore (DPA).

A yacht digital twin was required as an essential means of vessel familiarisation for crew handovers. This allowed new crew members the chance to explore the entire vessel in their own time prior to boarding. Not only would this digital tool provide crew familiarisation, but also provide clear and concise information regards equipment functionality, critical systems (such as power, steering and communication) and critical safety systems (such as fire fighting and buoyancy aid locations).

Having seen RINA's past VT projects (projects including commercial buildings, passengers ships, tug boats and even an empty oil tanker) the client knew their project was in experienced hands.

A digital twin was required to provide an immersive virtual environment for crew members (new and existing) to explore and familiarise themselves with the yacht's infrastructure, by using an interactive realistic human-eye view of this real-life environment. This environment needed to be explored either via a web browser (via any device) or for the full immersive experience, via a VR headset such as the Meta Quest 3.

Virtual reality simulations, videos, animations, eLearning resources, system critical floor-plans and downloadable documentation were then to be presented to the viewer - depending on which area of the virtual tour they were positioned.

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What were the specific client challenges the project addressed?

- The time-frame from crew on-boarding to client/owner arrival is usually very short for luxury yachts, leaving very little time for crew familiarisation prior to embarkation. The client needed a cost effective, easy-to-use solution that would benefit all crew members from captain to deckhand.

- The Virtual tour needed to be accessible from any part of the world, from any device and be hosted on a secure RINA server.

- The Yacht's manual is a large 388 page document. This manual was to be reconfigured as an interactive online PDF (for fast content access) and accessible during any point of the tour.

- Life jackets, life rafts and fire extinguisher locations were to be highlighted in interactive deck plans with instant access to their locations within the vessel.

- Most critical safely equipment is cumbersome and unsightly. On a luxury yacht, particular effort is made to conceal these essential items out of sight. A virtual tour would need to highlight all hidden items and their method of accessibility through the use of interactive hotspots and pop-up information boxes.
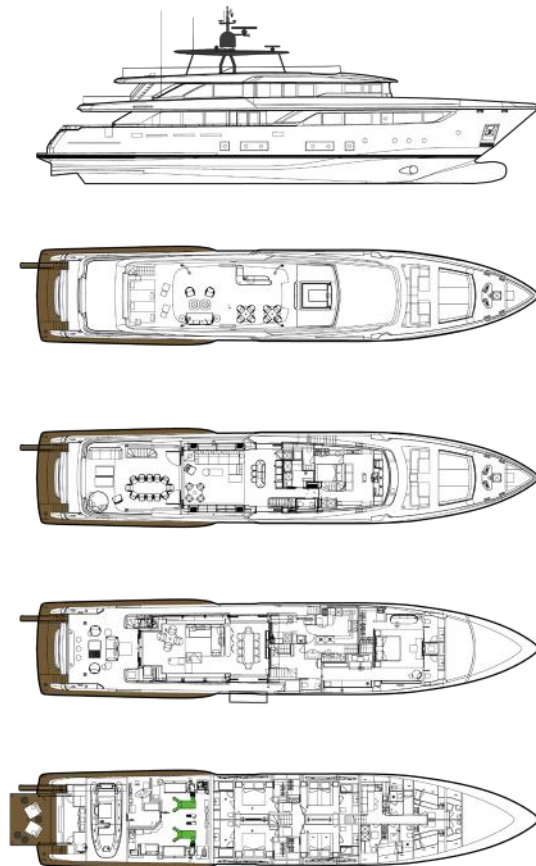
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Why is it interesting and relevant?

- Having a virtual tour of a vessel provides a selective learning experience like no other. This method of learning can be applied to any building, vessel or any other 3 dimensional space, regardless of location or size.

- The virtual tour is only the primary stage. Once the tour has been established, contextual eLearning modules can be integrated within the tour, to test the users knowledge as they explore. These eLearning modules can connect to a company's LMS; essential for setting KPIs within a crew's learning programme.

- Otherwise known as a 'Digital Twin' the virtual tour can display real-time information from the actual yacht. The yacht sends API (Application Programming Interface) information to the RINA Sertica database - this information then gets relayed to the virtual tour and displayed on the relevant interfaces throughout the tour.

- Virtual tours provide the most realistic experience without setting actually setting foot on the yacht. Contextual floor-plans for key systems provides the most efficient means of visual learning.

- Selective learning provides the user with easy access training for any part of the vessel. Navigation to sections of the vessel can be achieved in 3 ways:

  1. **Walk-through:** The user simply traverses the vessel to the relevant part of the vessel - as they would if they were on the vessel itself.

  2. **Deck plan:** all desks are accessible from the top right deck drop-down menu. Within each deck plan are clickable location markers that can be accessed with a simple tap.

  3. **Side menu:** all key locations and system critical floor-plans are accessible form the side menu.

- The viewers position within the vessel is always referenced within the deck plan. Their angle of view is indicated by the radar feature - very useful for complicated areas such as engine rooms and nav decks.

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Is it related to Innovation/Digitalisation or Environment & Sustainability?

Initially Innovation and Digitisation. Ultimately, it will also apply to Environment and Sustainability.

Where is it located?

Currently docked in Genoa, Italy.

What expertise, resources and technologies are or were involved?

- Working knowledge of the yacht, it's hardware and key areas of educational requirement was essential. We used a RINA Yacht SME for guidance on this.
- 360 cameras were used throughout the yacht to capture its virtual environment.
- The technical plans of the yacht were used for photographic position references.
- RINA graphic designers were used to design and create the user interface, interactive pop up boxes, interactive deck plans and 'how to use' videos.

Why is it important for RINA?

- Demonstrates capability in new and innovative approaches to virtual training.
- There are huge opportunities for this type of training in many of the industrial sectors we work with.
- This is a future proof method of training. Eventually RINA will be able to use AI (Artificial Intelligence) to track a vessels performance, provide the client or yacht owner with analytical data and intelligent guidance on vessel maintenance and efficiency.

Which are the main benefits for our clients?

- Effective training — cost effective, mobile and immersive.
- Efficient training management though LMS integration
- API integration will be a game changer for yacht owners as they will be able to obtain full visibility of the yacht's performance data from wherever they are in the world (via an internet connection). This data will also provide key data to improve Yacht efficiency — which is a growing requirement for most yacht owners. A digital twin will also allow remote technical support from shipyards and fleet managers direct to crew on-board the vessel from ashore.

Is there a website or factsheet we can look at?

Here is a link to the virtual tour:
http://digital.rina.org/demos/photogrammetry/42m-Yacht/index.htm

Here is a link to our Virtual Tour Overview video:
http://digital.rina.org/demos/photogrammetry/RINA-Virtual-Tour.mp4

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