

# Isonaval

Transforming its business with Dassault Systèmes' solutions for Yacht and Middle Ship



## Overview

### ■ Challenge

*A young, small yacht design and engineering company, Isonaval, wanted to expand the range of design and engineering services it provides to its customers*

### ■ Solution

*The company chose Dassault Systèmes' solutions for Yacht and Middle Ship and successfully expanded its activity to handle larger and more ambitious projects than before*

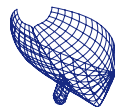
### ■ Benefits

*Isonaval has reduced project delivery times and increased productivity by up to 40%, enabling it to handle larger and more complex projects*



"We finally have a solution dedicated to naval architecture that responds to our specific needs. There are other 3D solutions on the market but they don't provide the reliability, precision and power that the CATIA solutions for Yacht and Middle Ship provide."

William Pegram  
Managing Director  
Isonaval



**ISONAVAL S.L.**  
NAVAL ARCHITECTURE AND ENGINEERING  
OFICINA TÉCNICA DE ARQUITECTURA E INGENIERIA NAVAL

### Small yet highly specialized in naval architecture, yacht and ship engineering

Founded in 2003, Isonaval is based in Barcelona, Spain. It specializes in end-to-end design and engineering of large yachts as well as recreational craft. Composed of a young creative team of designers and naval engineers, Isonaval manages naval engineering projects that cover styling, exterior and interior design, system and structural engineering, steel work, boat stability testing, measurement work and surveys, renovation and inspections.

After successfully completing a first project where Isonaval refitted a 30-meter steel motor yacht designed entirely with Dassault Systèmes' CATIA virtual design solutions for the Monty North shipyard in Barcelona, the latter decided to commission Isonaval to design and engineer a new 45-meter boat. Since Monty North did not have its own design office, it relied on Isonaval to assume this role, a role Isonaval could not have taken on without a powerful and complete yacht design solution based

on CATIA, DELMIA and 3DVIA Composer to manage the end-to-end development process. Isonaval delivered reliable 3D engineering information to Monty North, which considerably helped the shipyard improve production and assembly. "We are a young company and were not always a CATIA customer," said William Pegram, managing director, Isonaval. "Our previous modeling solution lacked the ability to manage a complete model required for efficient marine design, which was one of the reasons why we chose to manage the entire project with the Dassault Systèmes (DS) Solutions."

### From idea to concept

In the conceptual design and styling, or first phase of the project, Isonaval used CATIA to translate the customer idea or sketch into a digital illustration of the yacht that defined the vessel clearly enough to satisfy the customer and that gave everyone an idea of the cost and time needed to build it. Designers used the realistic rendering capabilities included in the CATIA solutions for Yacht and Middle





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Ship to quickly model and adjust the shapes of the vessel in 3D in accordance with the customer’s wishes. “The geometry was then used for downstream applications to create the structure, except for the hard top, which is a mock up,” said William Pegram. “This means that the hull, main deck, superstructure, and upper deck that we used downstream for the structure came from the first CATIA surface model.”

### Naval architecture process integration

The hull shape was created using CATIA’s surface functionalities, which are perfectly adapted to the technique of hull fairing and smoothing. Isonaval used the automatic lines plan function to create the drawing that was submitted to the certification society for approval.

CATIA’s Ship weight management function combined with the hydrostatic and equilibrium calculation capabilities enables engineers to quickly iterate to achieve the best solution and enables continuous control of weight evolution throughout the different phases of the project. “By linking the hull shape with the compartments and tank volumes, we were able to optimize and validate the project much faster and ensure

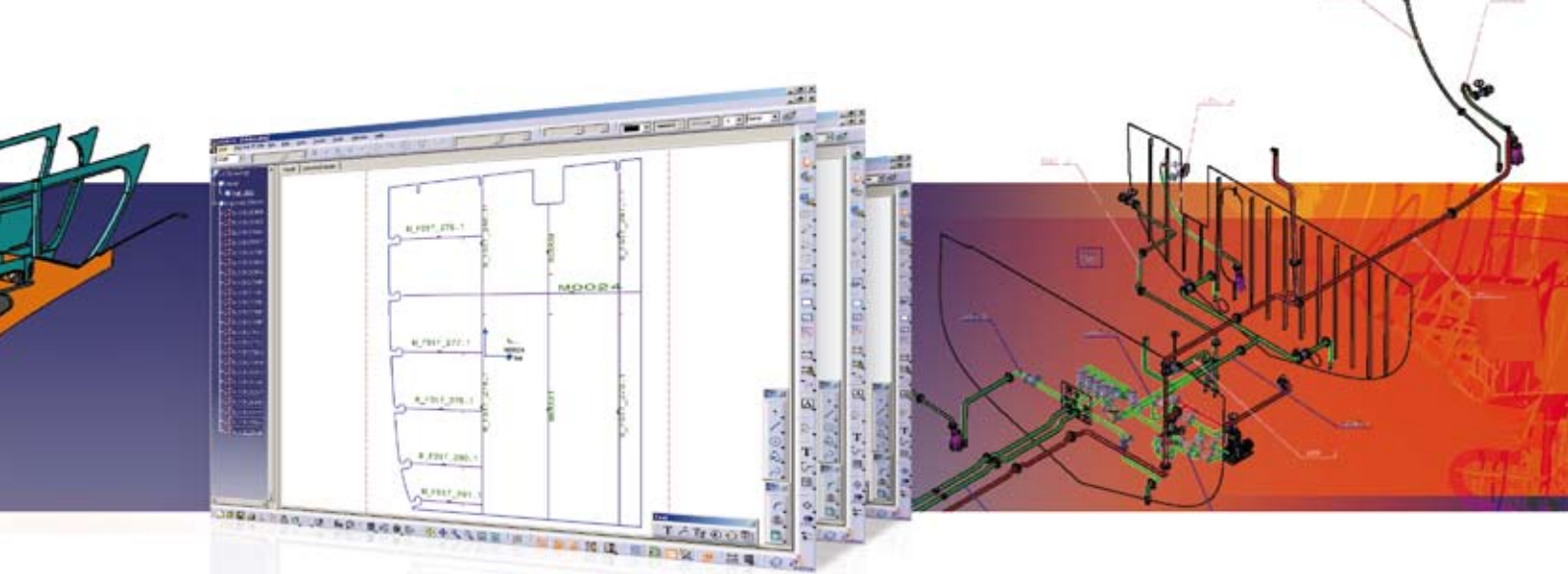
compliance with the classification criteria.”

### Automating the manufacturing preparation phase

Once the conceptual design and naval architecture were validated, Isonaval defined the structure of the vessel. This provided engineers with the structure’s precise weight, which was up to then estimated. Isonaval then generated all the manufacturing information that would be used to prepare the cutting files and templates for shell expansion. Using the modules for ship metallic structure design and manufacturing included in the CATIA solutions for Yacht and Middle Ship, Isonaval engineers quickly modeled the primary structure of the complete vessel and automatically generated the details (plate contours with slots and stiffeners with end cuts). They also prepared the manufacturing phase thanks to dedicated DELMIA functionalities that helped automate expansion of the shell plates and extraction of the cutting and marking data and then sent this information, in DXF format, to the metallic kit supplier.

### Multidiscipline coordination

The main equipment such as engines, generators and cooling equipment were included in the 3D model at the early stages



of the project to reserve the space and obtain the vessel's exact center of gravity. Coordinating the different disciplines, the structure with the equipment and pipes was easily done throughout the engineering process. Adjustments were made during the main structure modeling phase and during the pipe routing phase, ultimately generating a 3D view of all the systems of the ship. The objective was to obtain approval drawings and to avoid interference between the different systems during assembly.

### **Streamlining the manufacturing and assembly processes**

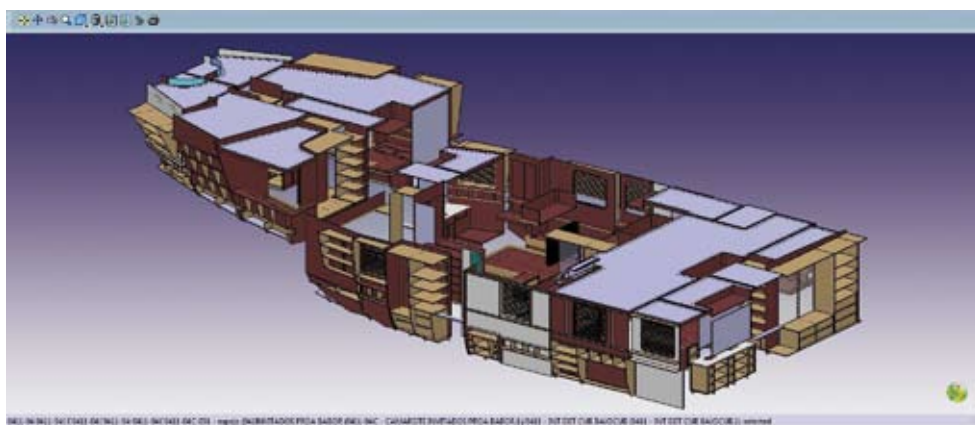
Manufacturing started less than two months after the signature of the contract

with Monty North. Creating a detailed digital mock-up very early in the process allowed Isonaval to begin cutting the pieces of steel of the first block with little risk of having to make modifications due to assembly problems thanks to the *Structure Manufacturing Preparation* module.

Once the hundreds of individual steel parts arrive at the shipyard to be welded together, it is important to provide workers with reliable and easy-to-understand assembly instructions. "A veritable business transformation took place in the shipyard thanks to new tools like 3DVIA Composer," said Pegram. "We used 3DVIA Composer to create our documentation directly from the 3D digital product data. As a result, we

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delivered practically no paper plans to the shipyard for the manufacturing process. Most of our information transited as electronic files and consulted on the shop floor using a laptop," he added.

The shop floor manager used 3DVIA Composer player to display the 3D mock ups of the different blocks as well as the part numbers. "With 3DVIA Composer we can display exactly what we need thereby eliminating unnecessary and not always precise assembly drawings that were often difficult to understand," said Pegram. "This helped make project meetings between the shipyard and Isonaval more productive. With 3DVIA Composer we were able to clearly show the way the different parts of the vessel should be assembled, or the way pipes should be laid out inside the boat."

### More ambitious projects in less time

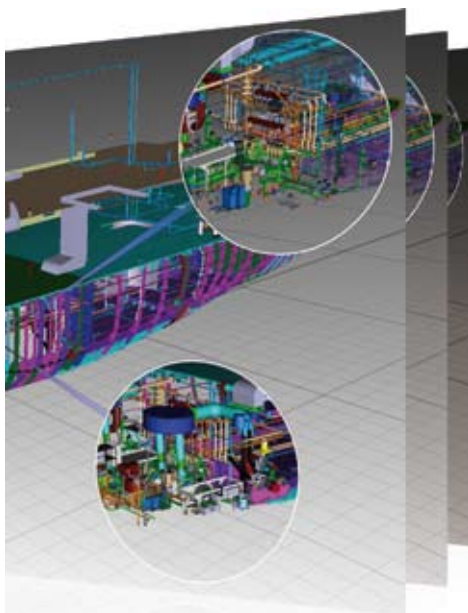
Thanks to the performance of the CATIA solutions for Yacht and Middle Ship, Isonaval was able, with only nine people and three workstations, to design and engineer a new vessel from A to Z with productivity gains of up to 40%. Other benefits included improvements in quality of engineering and design, a reduction in project delivery times and a more streamlined assembly process at the shipyard. "Concurrent engineering helped engineers save time during the preparation, manufacturing and construction of all the engineering systems while, in parallel, the metal structure of the boat was being assembled in the shipyard. Previously, the structure would have been constructed and then the engineering systems would have

been prepared," explained William Pegram. It is the first time that Isonaval managed a project as complete as this 45-meter vessel. As a result, the company has increased the scope of its services to other customers and thanks to the reduction in engineering time, is able to take on projects that are bigger and more complex. "We finally have a solution dedicated to naval architecture that responds to our specific needs. There are other 3D solutions on the market but they don't provide the reliability, precision and power that the CATIA solutions for Yacht and Middle Ship provide," said William Pegram.

In the future, Isonaval will use ENOVIA SmarTeam to manage design and manufacturing data for all its future naval design projects and use finite element analyses integrated in the ship primary structure design module.

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