



## LNM: CATIA V5 AND PLEASURE BOAT ARCHITECTURE.

The **CATIA V5** offer is now open to the industrial world in all areas of business.

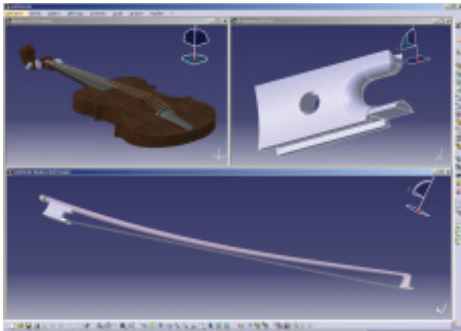
The **LNM company (Les Nouveaux Matériaux)** is a perfect example of this opening.

**T**his small enterprise from Marseille, which was founded 8 years ago, is an engineering firm which specializes in the study, design, calculation and implementation of thermo-hardening composite material parts. It works as a subcontractor in various areas such as energy, defense, sports and leisure, but sometimes also in the field of art. 55% of its turnover is export. In order to increase its growth, LNM has diversified its activities in areas that are particularly flourishing.

"Our first historical activity is the making of music instruments, with the manufacturing of

### "Integrating into CATIA our own design rules"

top-of-the-range composite material violin bows, which enabled LNM to be recognized among the best manufacturers in the world in this area" explains Olivier Philippot, President of LNM. "This market, although its volume is currently small, (only 10% of the bows currently in use are made of composites), is growing fast and our



products, which are distributed worldwide under the trade name CARBOW, already have excellent references, in particular with symphonic orchestras or with jazz musicians such as Regina Carter and Didier Lockwood."

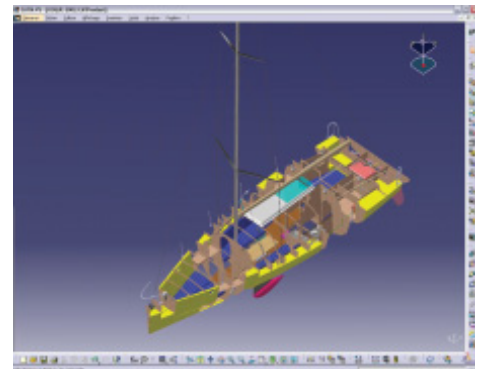
This is at the very least an atypical course for this graduate of the Centrale Nantes engineering college who discovered CATIA at the time of a training period at SUP'AERO. But the world of composites is much larger than it appears to be:

LNM then started working in the area of pleasure boat architecture, first as a subcontractor doing FEA calculations for boat repair and assessments.

But its leader's and his coworkers' passion for sailing, and the proximity of the Mediterranean sea have led the company quite naturally to start developing its own sailing boats with composite hulls. Today LNM is a pioneer in

France, since it fully combines, in an autonomous manner, the activities of design, complete calculation and making of the boats on the shipyard.

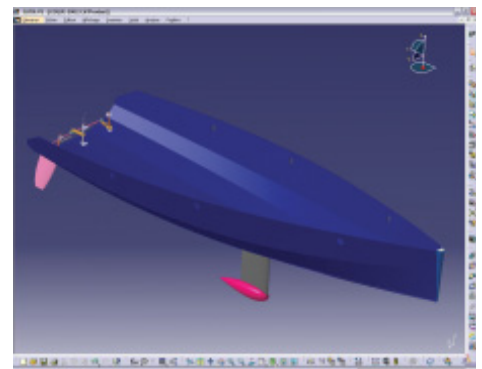
"Designing customized sailing boats could appear to be a challenge for a company like ours. I had personally been using CATIA for more than 13 years. But to meet this challenge and to guarantee the continued existence of LNM, we had to make the best choice. I therefore contacted the Dassault Systemes agency of Lyon in July 2000 to investigate the tool we needed ", says Olivier Philippot. "CATIA V5, running on a PC, proved to be the ideal solution due to its recent technology and rapid implementation, but especially due to its capacity to integrate within the design modules, the specific rules which we wish to apply to our boats: those of naval architecture."



The design of a sailing boat, like many other industrial products, depends on an established process that goes across various specific fields:

**Design of the hull and the appendices:** CATIA V5 allows to easily recover all the hydrostatic characteristics originating from dedicated software.

The associative definition of the hull and the appendices allows the designers to research optimal shapes for the sailing boat to obtain the best possible performances at sea. In order to take into account all the real criteria and to perform virtual simulations, knowledge rules reproducing the position of the boat when listing were integrated within





CATIA V5. This capitalized know-how allows to optimize by iteration all the boats under study.

The use of CATIA V5, compared to software specialized for naval design, allows a more authentic, integrated and associative design of the appendices, such as the keels and rudder blades.

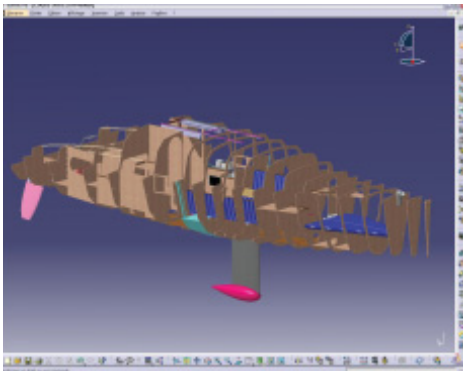
### Design of the sails and the rigging:

This type of design does not generate any complex geometrical forms, but the delivery time is optimized using knowledge rules on the deformation of the masts and the various positions of the forces on the entire rigging.

### Design of the boat structure and interior fittings:

The definition of the structure of a sailing boat depends on two key criteria. The first, related to the compliance with the regulations (ISO, VERITAS), is handled by the parameter setting and storage of the knowledge rules of CATIA V5. The second, related to the particular characteristics of the customer's specifications requires an iterative design.

The contributions of CATIA V5 for the definition of the structure allow a complete integration of the structure with the hull during the phases of iteration, optimization or modification.



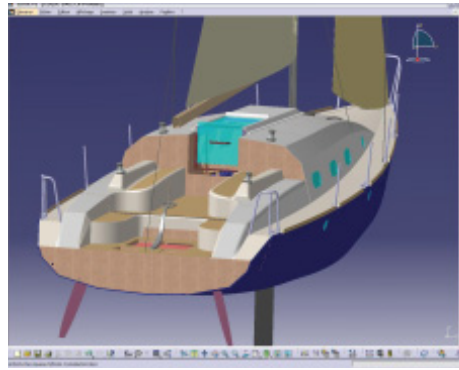
The definition of the interior fittings is close to the structure design. In addition it is subject to significant aesthetic criteria. In this case also, CATIA V5 is a useful marketing tool since it allows the future customer to choose the interior fittings (location, ergonomics, materials, colors) on a totally virtual model.

### Installation of fittings and equipment:

By using a library of manufacturer components it is possible to integrate into the digital model of the sailing boat the entire fittings and the engine, the pipings for fluids and electricity, as well as the safety equipment.

### Final optimization of the boat:

Nevertheless, in order to obtain a competitive boat for racing or pleasure, it is necessary to



constantly perform estimates of weight and to control the position of the centre of gravity. The position of the masses and inertias as well as the associativity of CATIA V5 allows LNM to optimize its boats within very short deadlines. Moreover, by using the parts Bill of Material it is possible to eliminate manufacture and assembly errors.

LNM currently makes its sailing boats 100% with CATIA V5. Thanks to this software LNM was able to design, in less than 3 years, six different boats from 8 to 14 meters. The experience stored in CATIA V5 provides this small company with the reactivity and flexibility required by its market. LNM now has the productivity and product quality worthy of a large naval architectural company.

*"We are sailing fanatics and we are proud to be able to make boats which sell well and win regattas, such as the SORMIOU 28", concludes Olivier Philippot. "Three years after having acquired CATIA V5, our work has borne fruit and our return on investment exceeds all that we could have imagined at the beginning of our endeavor. We have now built up customer loyalty, and our development prospects are much wider. CATIA V5 also remains for us a major asset to meet the requirements of the other areas of industry where LNM is present."*

Let us bet that CATIA V5 and LNM will steer the course together toward new findings and that this small company in Marseille will continue to seduce its customers by its creativity and its professionalism. Passion and innovation are the two key elements that guide our customers. ■



### ❑ Ford Motor Company

IBM and Dassault Systemes were selected by Ford Motor Company to provide and integrate their most advanced solutions for Product Lifecycle Management (PLM), among which software CATIA V5 and ENOVIA VPM.

This long-term contract involves the installation of the CATIA V5 and ENOVIA VPM solutions developed by Dassault Systemes as well as counseling by IBM and Dassault Systemes as to the processes and methodology to be adopted. Land Rover and Volvo Cars, which belong to Ford Motor Company, already use PLM solutions from IBM. Ford will integrate these solutions at the level of the entire company in its new generation C3P (PLM) system environment.

### ❑ DELMIA

A recent study by the engineering and consultant firm CIMdata on the benefits of digital manufacture indicates that companies using the DELMIA digital manufacturing solutions, obtain results that match their initial objectives and expected benefits and even exceed these.

The study is based on information obtained from DELMIA customers in the automotive, aerospace and shipbuilding businesses both in the United States, in Europe and in Asia. According to the study, companies which implement technologies of digital manufacturing can expect returns five to ten times their yearly investment.

CIMdata indicates that the firms using technologies of digital manufacturing reduce their time to market by 30%, the design modifications by 65% and the time devoted to the planning of manufacture by 40% on average. Moreover, production can be increased by 15% and the general production expenses reduced by 13%.

### ❑ Dassault Systemes and ESI Group

Dassault Systemes and ESI Group announce the signature of a strategic partnership agreement for CAA development following which ESI Group will develop and market its next generation of solutions on the CAA V5 platform. These solutions will be dedicated to the digital simulation of prototypes, manufacturing processes and utilization environment. Within this framework, ESI Group will first of all devote its efforts to deliver within Version 5, realistic multi-physical solutions of digital simulation for crash tests and stamping processes.