



SMAR Azure Ltd



Bringing Innovation to the Marine Industry

EXPERTISE

- Sail-Plan, Sails and Rig Design
- Computational Fluid Dynamic (CFD)
- Advanced Structural Analysis (FEM/FEA)
- Advanced Fluid-Structural Analysis (FSI)
- Boat Performance Prediction
- Software development

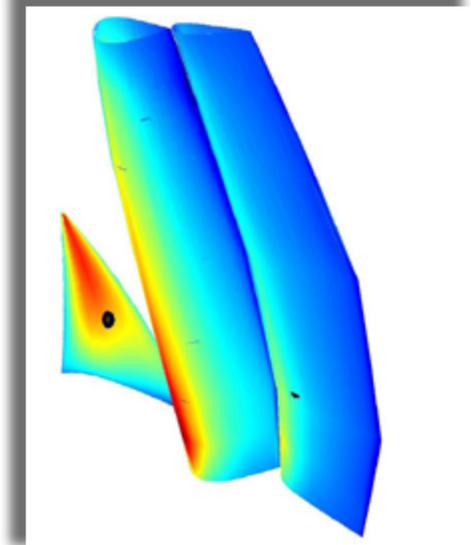
FACTS

- 10 years of experience in sailing yacht industry
- A multilingual team comprising software, naval and aerospace engineers
- 180 customers in 27 countries across 5 continents
- Unique proprietary technology for sail and rig design
- Dedicated team for R&D & SW development

SMAR Azure's Technology - Latest Developments

AERODYNAMIC ANALYSIS

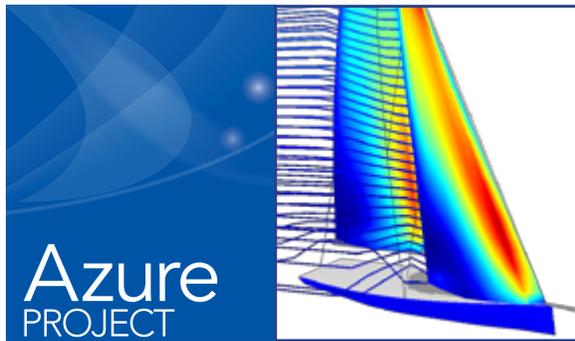
- ▶ 3-dimensional panel code development to evaluate the pressure distribution over blunt bodies.
- ▶ Method can be applied to multiple bodies, such as wing-flap
- ▶ Full wake relaxation method developed for accurate results
- ▶ Viscous corrections available
- ▶ Integrated Panel and Vortex Lattice Method, when the blunt body is used in connection with thin structures, such as sails
- ▶ Automated mesh creation for potential flow methods and RANSE methods



STRUCTURAL ANALYSIS

- ▶ 6-dof beam element, cables and membrane elements (used also in combination)
- ▶ Robust solver including damping like forces and wrinkling model
- ▶ Automatic finite element model creation: including fiber reinforced membrane and beam elements
- ▶ Fluid-structural interaction solution using RANSE analysis

Products



AzureProject is the complete and versatile sail design and optimization software that allows sail designers to move effortlessly among various phases of rig modelling, 3D sail design and fibre layouts. Its integrated aerodynamic, structural and aero-elastic methods help sail designers to improve sail shapes and achieve optimal performance.

" We are pleased to have had the opportunity to collaborate with SMAR Azure to provide our client with performing sails. We look forward to race with them." **Ian Broad (Hood Sails - AUS)**



SA Evolution is the unique and accurate software that virtually simulates the aero-elastic behaviour of membrane sails in up-wind conditions. Comparing alternative fibres and layouts and analysing the resulting sail-shapes, it allows to design light and fast fiber-membrane sails.

" With regard to the results seen using SA Evolution on our yacht Living Doll's sails (...) the boat reacted very closely to what the analysis suggested and structurally the sails were stronger enough to carry the yacht through large range of wind strengths whilst maintaining a very light base structure"

Richard Bouzaid (Doyle Sails - NZ)



RigEdge is the unique and innovative software that enables Yacht and Rig designers to rapidly define rig dimensions. Using its robust analysis tools it is possible to quickly evaluate rig deformation under dock tuning, sailing and dynamic loads.

" With RigEdge I am able to calculate the running loads and the load on the chainplates myself and make informed choices regarding the construction from the start of the process."

Martijn van Schaik (Seahorse Naval Architects - NL)

PRODUCT SERVICES

Training

Introductory & advanced courses led by expert SMAR Azure engineers for all products

Maintenance & Support

- Free updates, manuals and technical dispenses, bug fixing
- Personal and dedicated technical support via e-mail, phone, Skype and web-based e-ticket

" We would like to thank SMAR Azure's team members not only for such a fantastic product but also for the technical support they have given us"

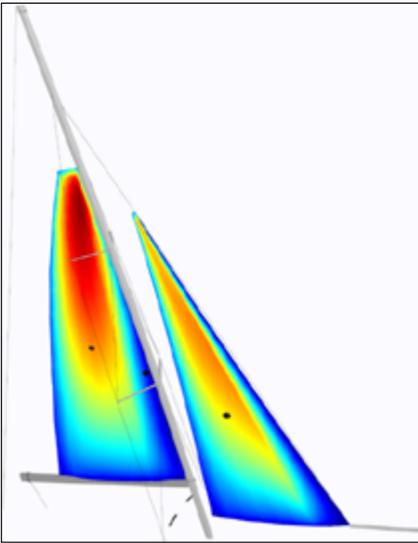
Pedro Gianotti (UK Halsey - USA)

Consultancy Services

DESIGN & ANALYTICAL SERVICES

Rig and Sail-Plan Design

Optimal sail-plans and rig-plans are developed through an automated evaluation of sail coefficients in a variety of sailing/trimming conditions and by varying the sail's geometry.



Sail & Fiber Layout Optimization

Using our integrated sail design and analysis technology, optimal sail shapes can be achieved in both upwind and downwind conditions. What is even more, our engineers design fiber layouts that are light, flexible and capable of holding the desired shape.

Boat Performance Analysis

SMAR Azure can provide yacht designers with the matrices of the sail's coefficients ready to be used by commercial/custom VPPs.

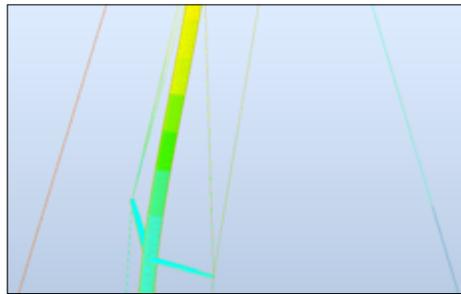
SOFTWARE DEVELOPMENT

- Development of bespoke software application tailored to the user's unique requirements
- Customised versions of the extant SMAR Azure packages

Rig Analysis

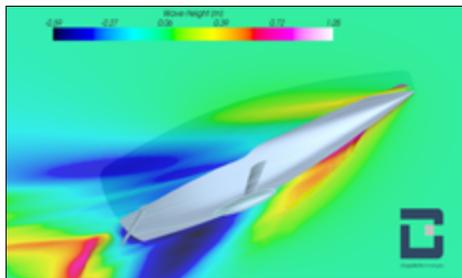
Taking into account dock tuning conditions and sailing loads on rigs, SMAR Azure can measure:

- Rig global strength, by assessing:
 - Strength of running and standing rigging
 - Stress in the mast tube
- Chain-plates loads
- Rig Natural Frequencies



If needed SMAR Azure can also:

- Analyse the impact of dynamic loads, including compliance with the classication societies's guidelines for Sailing Rigs certification, under MCA LY3 code;
- Design and analyze Gaff rig and Multi-mast rig configurations



Shaft Alignment

The propulsion shaft of a ship transfers engine power to the propeller. Several bearings support the shaft and connect it to the hull structure.

The loads applied on the shaft beam are:

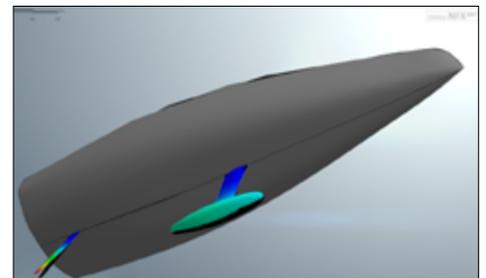
- Hydrodynamic forces and moments produced by the propeller
- Weigh of the propeller and shaft

FEM/FEA of the shaft calculates its linear and angular deformations in order to avoid shaft misalignment.

Yacht Fluid-Structural Interaction

Accurate CFD calculation of the hydro/aero forces acting on yachts and relative deformation, via advanced structural (FEA) and fluid-structural analysis (FSI).

The result is high performance, which could mean structural integrity, low noise, low fuel consumption, speed or endurance, depending on the customer needs.



" SA recently developed a sophisticated software solution for one of DIMENSION-POLYANT's applications. From the start of the project a detailed plan of features and functionality was laid out along with a budget. Throughout the software development excellent follow through to the plan and budget was executed by the project manager, the management and the entire team at SA. It is a pleasure to work with a supplier like SA!"

Kenneth Madsen, (DIMENSION-POLYANT Inc.- USA)

The Company

UK-based SMAR Azure Ltd was incorporated in 2004 by Dr Sabrina Malpede (CEO) and Dr Alessandro Rosiello (CFO) to utilise the award-winning technology developed by Sabrina during her PhD research and awarded in 2001. Dr Donald MacVicar joined the Company in 2004. Donald has a PhD in software engineering and leads our R&D team. Over the past decade, SMAR Azure has grown substantially in terms of its team of dedicated professionals, knowledge/technology required for innovation in yacht design/engineering, and product portfolio.

OUR VISION

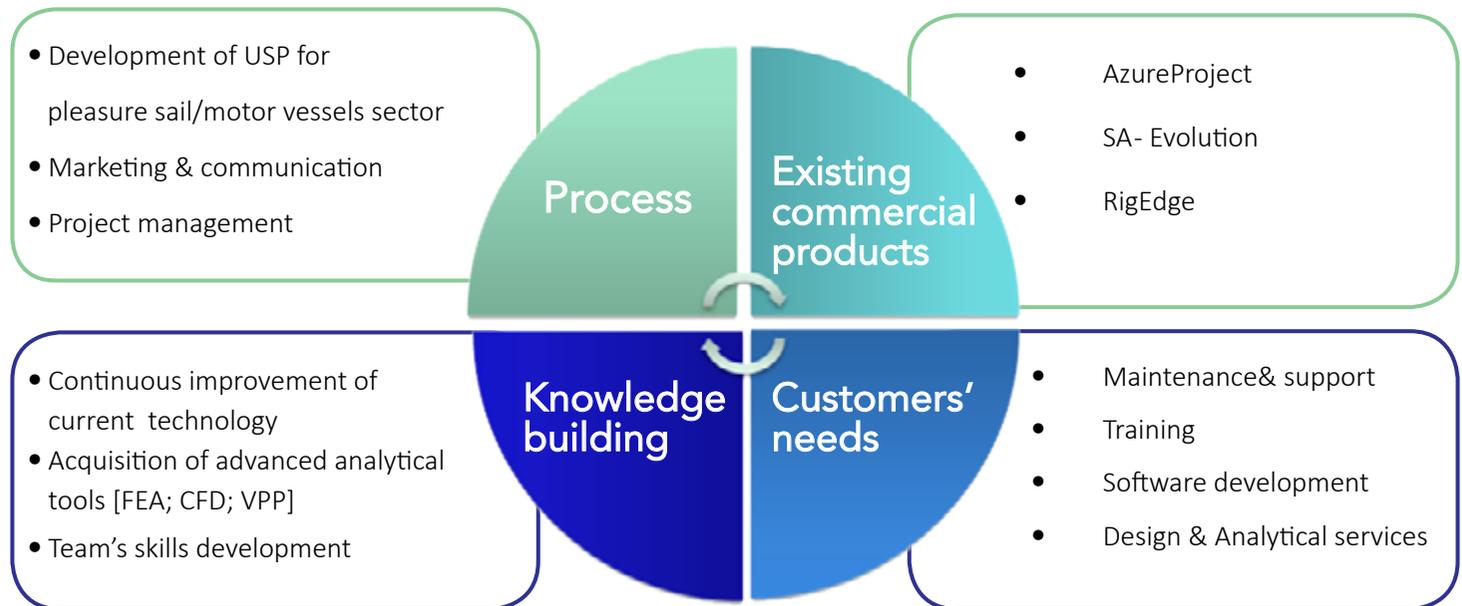
Bringing Innovation to the Marine Industry via continuous enhancement of our core competencies

OUR STRATEGY

We develop, improve and commercialise products and engineering services

We address future needs via systematic R&D activities to deliver high values to our customers

HOW WE DELIVER



SMAR Azure is dedicated to deliver excellence and SMART solutions thanks to our team, which comprises three expert software developers and three specialists in the design, aerodynamics, structural and aero -elastic analysis of sailing yachts and their components. We work closely with designers and manufacturers of sails, yachts and rigs to deliver solutions that are tailored to the needs of each customer. Our products are based on proprietary technology, developed in house by SMAR Azure team in close collaboration with major industry players.

Who Trusts Us



AND MANY MORE...

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