




SEABUBBLES

A NEW MODEL OF WATERBORNE MOBILITY,
DRIVEN BY INNOVATION

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2

3

SEABUBBLES

A FRENCH HIGH-TECH COMPANY FOR SUSTAINABLE WATERBORNE MOBILITY

The SeaBubbles: flying boats with zero emission.....	4
Decarbonisation and a unique boating experience, driven by technology.....	5
Service solutions to support the development of a zero-emission boating ecosystem.....	10
Uses of SeaBubbles Mobility Solutions.....	12
An inspirational and dynamic company at the heart of the green transition.....	14
News and next steps.....	15

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THE SEABUBBLES, FLYING BOATS WITH ZERO EMISSION

SeaBubbles' mission is to provide waterborne passenger transport with zero waves, zero noise and zero emissions. SeaBubbles represents a new generation of 100% electric foil-equipped flying boats that help protect natural ecosystems by limiting the impact of boat travel.

With its innovative hydrofoils, SeaBubbles draws on state-of-the-art technology to drive decarbonisation in the nautical sector, offering more environmentally-friendly boating and a unique "flying" experience for passengers.

Packed with innovations inspired by the shipbuilding, automotive and aeronautic industries, SeaBubbles represent an alternative mobility solution like no other in the world, combining innovation, respect for nature, and the pure joy of boating.


The combination of hydrofoil technology and cutting-edge materials offers a new vision of energy-efficient and decarbonised motor boating, available and accessible to all.

Offering energy efficiency, reduced coastal impact and an incredibly comfortable ride, electric hydrofoils align perfectly with cities' efforts to decarbonise their public transportation systems and encourage new applications that are quieter and more environmentally friendly.

Through close, effective collaboration with public authorities, SeaBubbles has contributed to the development of regulations supporting innovative waterborne mobility, helping to make it **the first electric hydrofoil to obtain approval for passenger transport in the world.**

With their innovative designs, SeaBubbles have always been at the forefront of waterborne mobility. It was important to our company to obtain the necessary approvals to transport passengers, and to finally see our innovative watercraft in operation to help support local decarbonisation. We're proud to have brought both public authorities and private stakeholders together for an initial public line on Lake Annecy, where hundreds of passengers have had the chance to experience the incredible smoothness of flying above the waves. With the approval of our new 8-seat model and our acquisition of Neoclean technology, we're now focusing our efforts on the start of our industrialisation phase. This is only the beginning of zero-noise, zero-wave and zero-emission waterborne mobility which truly benefits everyone.

VIRGINIE SEURAT
SEABUBBLES CEO



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DECARBONISATION AND A UNIQUE BOATING EXPERIENCE, DRIVEN BY TECHNOLOGY

Imagine slicing through the water without leaving a trace.

Able to take off in only 3 seconds, the SeaBubbles 4-5 seat "Bubble" model is 100% battery operated. Its foils drastically reduce the force needed to displace water around its hull. How is that beneficial? Our hydrofoil watercraft achieves a 40% reduction in energy consumption, an important argument in adopting an electric powertrain.

Hydrofoils are a technology whose origins lie in river trade, and which are still proving their worth today in the world of boat racing. The majority of regatta or offshore racing boats now have foils which free them from certain limitations of their environment. Iconic modern regattas like the Americas Cup, the Route du Rhum and the Vendée Globe feature large numbers of hydrofoils, reflecting the broadening appeal of these game-changing new components that let boaters fly above the waves with stability, speed and smoothness.



The Bubble

The Bubble travels at a cruising speed of 11 knots (20 km/h). This 5m x 2.5m boat has a lounge-like internal layout where passengers can relax and get away from it all for a while.

The choice of automotive design opens up the possibility of using boats in a totally different way, particularly for urban users. Being protected in a capsule, with no rolling, no spray, no purring of the engine and no diesel fumes completely transforms the sailing experience and makes it accessible to most people. No more seasickness! At 7 knots, the boat rises above the surface of the water, minimising the turbulence from its wake. The "Bubble" water taxi is available in two versions: one with an enclosed cockpit for sailing in all weather conditions, and one in a convertible format that offers a panoramic view.



The Bubble and the SmartBubble,
two unique experiences

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Hydrofoils

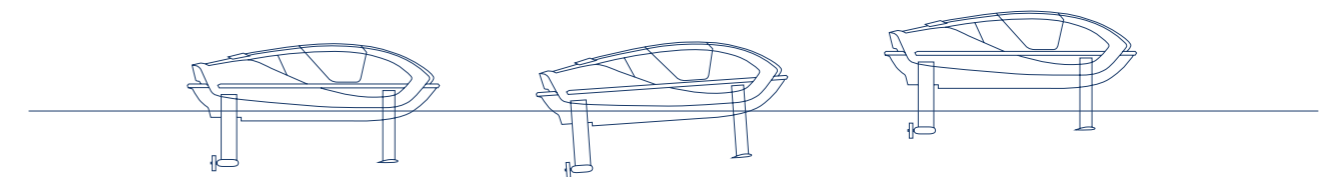
SeaBubbles are mounted on “inverted T” carbon foils which are operated by a dynamic control system. The foils are split into flaps, similar to those seen on aircraft. The actuators automatically adjust the flying height at a frequency of 10Hz and counteract rolling, pitching and yawing motions. The sensors on the sides measure the flying height and exchange flight stability data with the on-board computer.

The computer is known as the Flight Control System. This software was specifically developed to stabilise the boat by means of an inertial measurement unit and controls the orientation of the foil flaps in real time. This technological choice enables the boats to take off and fly at low speeds – an important feature for passenger transportation, which often takes place in speed-limited areas.

Flight stability

To further expand its expertise in flight control, the company acquired Neocean’s technology in June 2024. Neocean made its name by developing the Overboat, a small hydrofoil catamaran with proven stability. This acquisition will strengthen the industrialisation strategy for future models in the SeaBubbles range.

Vincent Dufour, founder of Neocean: *“We’re thrilled to see our cutting-edge technology joining with the innovation of SeaBubbles. Their vision and expertise will maximise the potential of our flight control system, accelerating innovation in the sustainable maritime mobility and pleasure-boating sector.”*



Due to its minimal contact with the water, the foil generates little drag and gives SeaBubble passengers a unique flying sensation

6 The SmartBubble, the latest addition to the SeaBubbles range

Bigger than the other models, the 8m x 3.5m craft is available in a fully electric version with batteries or with a hydrogen fuel cell. This hybridisable model can adapt to the operator’s needs and to the infrastructure of the location where it’s used.

The 8-10 seat water taxi sails at 16 knots at cruising speed and meets the needs of boat operators and tourist establishments looking for a more spacious boat that can offer greater energy capacity, carry more passengers and sail closer to the shore thanks to its retractable foils.

Tested and verified on Lake Annecy, the SmartBubble has **obtained certification** in pleasure boating safety category 245. With this certification, SeaBubbles has taken a new step forward in increasing the availability of electric hydrofoil watercraft. **The boat was presented on water at the Cannes Yachting Festival** where she met her market and flew with her first passengers onboard.



A hybridisable platform

The SeaBubble H2 version is equipped with a hydrogen fuel cell. It incorporates all the cutting-edge technologies driving the energy transition and offers outstanding battery life, with a very fast charging time of only 4 minutes when docked – all with zero carbon emissions, in keeping with the company’s DNA. In all of these ways, the innovative and environmentally-friendly SeaBubble H2 opens up new possibilities for waterborne mobility.

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Foil technology, based on technological breakthroughs in the field of yacht racing, is currently being deployed for short-range solutions in the shipbuilding industry. Foils sharply reduce the wetted surface and the water mass displaced during operation. Freed of much of its adherence to the water, the boat flies over the surface, saving a considerable amount of on-board energy and minimising the creation of wake waves that contribute to shoreline erosion.

EMMANUELLE BLANC TANGUY
SEABUBBLES OPERATIONS DIRECTOR



On-board power

SeaBubbles’ mission is to support the decarbonisation of the nautical sector, which is why our hydrofoil boats are powered exclusively by electric motors. Two embedded technologies are now available: a battery-operated powertrain and a hybrid powertrain with a PEM fuel cell.

The all-battery line matches current market and infrastructure capacities. More and more landing stages are now being electrified to enable charging, and marinas are opting for turnkey solutions to help users join the green transition to electric power. As part of this shift, SeaBubbles offers 100% electric boats which can be easily charged at any charging point.

Electric boats, like electric cars, are amazingly quiet and vibration-free, giving users access to the greatest of all luxuries: the beauty of Nature.

SeaBubbles transforms boating, in terms of both the passenger experience and its low carbon footprint. This "zero-wave, zero-noise and zero-emission" transport solution is as enjoyable for users as it is environmentally friendly, making it ideal for use in cities and protected areas. As discreet as a bubble gliding over water and as extraordinary as a flying fish, the SeaBubble draws its inspiration from the richness of nature and offers an alternative technological and eco-friendly mobility experience that is truly magical.

Raised by self-stabilising foils and powered by 100% electrical energy, the SeaBubble is a "made in France" product.

High-end comfort...

The unique hull design with its enclosed cockpit offers a comfortable ride at any time of year. The composite material of the passenger compartment was designed to withstand sailing pressures specific to flight. The interior layout is adjusted to the centre of gravity, in relation to the flight control system. It is customisable and can be jointly studied by the shipowner and SeaBubbles' teams.

... and an extraordinary boating experience

The two butterfly doors, on the port and starboard sides, provide access to the passenger compartment. Passengers walk down two steps to access the cockpit. Between 7 and 10 knots (depending on the model), the SeaBubble leaves its Archimedean mode and gently takes off. At cruising speed, passengers enjoy a feeling of lightness and weightlessness as the boat skims across the water.

With its "T-shaped" foils and dynamic control system, the SeaBubbles hydrofoil is ideal for sailing on lakes, rivers or in sheltered bays. Whether on Lake Annecy right now with this initial public line, or on Lake Geneva, the River Thames, Dubai Harbour, Sydney Bay or San Francisco Bay, the possibilities for adopting this new form of clean, futuristic transport are endless.

CYRIL MOENE
SEABUBBLES DEPUTY CEO

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SERVICE SOLUTIONS TO SUPPORT THE DEVELOPMENT OF A ZERO-EMISSION BOATING ECOSYSTEM

Towards a local mobility solution that is sustainable, shared and decarbonised

Urban mobility is a crucial challenge today, and will be even more so over the coming years, particularly for local authorities. River-sea passenger transport has undergone remarkable growth in recent years.

While ownership of a personal vehicle used to be the norm, habits have been shifting towards alternative ways of getting around, mainly due to environmental necessities. Mobility is becoming shared and multimodal.

Transport modes are needing to adapt to changing uses and, above all, be clean. This is why large urban areas are implementing specific mobility solutions, including seasonal ones, to avoid pollution peaks, prevent excessive traffic density and ensure user comfort.



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Two main challenges: reducing pollution and keeping traffic flowing smoothly

How does the waterborne mobility sector fit into this landscape? Our major urban centres have mostly been built in close proximity to bodies of water, which have always provided natural infrastructures for transporting goods and passengers, as well as gateways to new discoveries and economic possibilities.

Much like the automotive and industrial sectors, the marine sector is therefore beginning to decarbonise its networks. This initiative is central to the work done in shipyards, by shipowners and, in the case of mobility, by cities.

Private operators are following their lead. To respond to their customers' interest in exploring smoother, quieter and more environmentally-friendly forms of mobility, they are looking for ways to offer decarbonised mobility options to customers.

According to the AFBE (French Electric Boat Association), the electric boat sector is set to experience significant growth driven by regulations which are increasingly favourable to electric propulsion, particularly in protected areas where motorboats will gradually be banned. Numerous examples in Europe, such as the Calanques National Park, LEZs (low-emission zones), the Norwegian fjords, Alpine lakes or the canals of Amsterdam, reflect a dedicated initiative to ensure the preservation of aquatic ecosystems. The association also estimates that the global electric and hybrid boat sector could be worth as much as 20 billion dollars by 2027. This bodes well for the quality of life around bodies of water which attract large numbers of users. So, will the constant roar of engines finally become a thing of the past?

These new aspirations are supported by the regulatory frameworks covering river transport in France, which include licences and safety standards with an increasing focus on zero-emission navigation.



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Addressing the challenges with SeaBubbles Mobility Solutions

To address these challenges, SeaBubbles has created SeaBubbles Mobility Solutions, a range of turnkey services designed to assist local authorities and boat operators in implementing effective decarbonised waterborne mobility solutions in their regions.

By mobilising local stakeholders at the institutional, administrative and operational level, it supports the implementation of ambitious projects focusing on environmentally-friendly waterborne transport.

SeaBubbles Mobility Solutions is coordinating the introduction of decarbonised service lines:

- By setting up pioneering consortia to mobilise all stakeholders (public bodies, partner operators) around an inspiring and concrete collaborative project, such as a public line;
- By providing an industrial and operational service, namely by providing charging points, sourcing zero-emission boats, carrying out administrative tasks (e.g. navigation licences, insurance), providing landing stages and encouraging people to use the services.

USES OF SEABUBBLES MOBILITY SOLUTIONS

Innovative, zero-emission public flying boat lines: a first in France, launched with the Grand Anancy conurbation during summer 2023

With its SeaBubbles Mobility Solutions, SeaBubbles offers local authorities an innovative form of collaboration, along with a range of turnkey services to help them develop decarbonised waterborne mobility solutions in their region.

This prompted the Grand Anancy conurbation to choose SeaBubbles Mobility Solutions for the deployment and management of an experimental boat service between Anancy and Veyrier-du-Lac, which operated between 1 July and 31 August 2023. The Grand Anancy conurbation has decided to offer this electric shuttle service to combine the charm of its region with environmental protection. The pilot service was operated by the SeaBubbles Mobility Solutions consortium, which brings together the various stakeholders who are committed to decarbonising this fragile natural setting. The shuttles provided by SeaBubbles and its partners are electric vehicles which are silent and create no waves. They not only provide an ecological alternative to traditional modes of transport, but also offer a practical and speedy way to get around on the lake.

By bringing other electric boat operators on board, SeaBubbles is assuming the role of project manager for a decarbonised shuttle boat solution and supporting the development of a complete electric ecosystem covering lakes, rivers and seas.

These pilot services are a first and necessary step towards the wider adoption of electric boats. In fact, this first usage scenario provides an opportunity to adapt the existing infrastructure – electrifying landing stages, for example – and also to adapt regulation to reflect new uses of electricity.

The project's primary focus is the Bubble flying boat, which glides through the water on hydrofoils. These submerged wings, or hydrofoils, lift the hull out of the water to offer reduced energy consumption and significantly higher speeds than traditional hulls. The feeling of flying over the water also spares users the discomfort often associated with waterborne transport, enabling greater numbers of urban passengers to use waterways for their travel needs.

The inaugural 2023 season for this zero-emission river shuttle in the Grand Anancy conurbation was a resounding success, demonstrating the immense potential of alternative mobility solutions.

With a remarkable 92% passenger satisfaction rate, the service was applauded for its smooth operation, the exceptional passenger experience and the dedication of its staff. The quiet, bump-free ride of the zero-emission boats was especially impressive to passengers, with 70% specifically praising this aspect of the experience. That enthusiasm was reflected in extraordinary passenger numbers, with boats filled to 90% capacity, and in massive support for continued expansion of the service, with 94% of passengers hoping to see it return soon.

Beyond the satisfaction of the 2000 passengers who used the service, the project also generated tangible environmental benefits, saving 20,000 litres of fuel and avoiding 50 tonnes of CO₂ emissions – a number that should reach 100 tonnes with the complete replacement of conventional boats. This success is a testament to the viability and attractiveness of modern transport alternatives, inspiring new initiatives to decarbonise transportation systems and create a cleaner future with a focus on enjoyable user experiences. The positive response to this project highlights the public's growing desire for environmentally-responsible transport options, opening the door to widespread adoption of similar projects in the future.

With 8 round trips a day over a period of 2 months, this joint initiative eliminated 100 tonnes of CO₂ emissions on Lake Anancy compared to traditional combustion-engine watercraft.



A few uses of the SeaBubbles

- Shift tourism to new solutions that are both exciting to use and have a low environmental impact
- Urban and peri-urban transport near protected bodies of water
- Professional travel
- Media events and raising awareness of innovation

AN INSPIRATIONAL AND DYNAMIC COMPANY AT THE HEART OF THE GREEN TRANSITION

Towards the integration of a hydrogen system

Hydrogen is an important element in the process of decarbonising the land and mobile sectors. With high density storage in its fuel cell application, it releases energy at a constant rate through "stacks" of proton exchange membranes (PEM). The energy produced powers batteries, known as buffers, which can manage the power spikes required for navigation. Once the issue of charging infrastructure availability is addressed, battery charging times will be reduced from several hours to several minutes.

An expanding industry

As we face the threat of global warming, the energy transition has become a top priority, with a significant increase in public initiatives in this area. The worldwide deployment of the hydrogen option is growing faster than ever.

In early 2021, over 30 countries released hydrogen roadmaps and more than 200 large-scale projects were announced.

In metropolitan France, the France 2030 investment plan is included in the French Energy Transition for Green Growth Act. It aims to increase the share of renewable energy to at least 32% of final energy use by 2030. Because it brings undeniable advantages in terms of low-carbon energy production and energy independence, the hydrogen option has been identified as a priority in such transition plans.

By using eco-friendly hydrogen as fuel, SeaBubbles aligns perfectly with initiatives designed to develop renewable energy use and reduce greenhouse gas emissions, pollutants and fossil energy consumption. An alternative fuel for the future, low-carbon hydrogen is converted by fuel cells into clean energy. Advances in electrolysis technology are allowing hydrogen to be produced at low cost with a low carbon footprint before it is stored for use, making hydrogen a promising option for the future of an energy transition that promotes the development and storage of locally-produced renewable energies.

SeaBubbles paints a magnificent picture of what the future of maritime transport might look like. Through their inspired vision, we can imagine a form of mobility that has only a minimal impact on the environment. SeaBubbles has harnessed the power of technology to respect and protect the fragile ecosystems we depend on. The future of our planet depends on this kind of innovation. Life is movement, and moving in harmony with nature is the ultimate achievement.

SASHE ANNETT

FOUNDER OF H2 VISION (UNITED STATES)



NEWS AND NEXT STEPS

SeaBubbles is a pioneering French company specialising in flying electric boats for passenger transport, offering the promise of zero-noise, zero-wave and zero-emission boating. Acquired in 2021 by an investment fund based in Lyon, the business has had multiple successes and raised the bar for electric hydrofoil boats around the world.

1. **The first units are currently being** manufactured in the company's workshops in Saint-Ferréol, on the shores of Lake Annecy in the department of Haute-Savoie.
2. **Passenger transport approval for the 4-seat Bubble model, the first electric hydrofoil to receive this approval in France**, enabling the rollout of the first public line on Lake Annecy (summer 2023).
3. **Pleasure craft approval for the 8-10 seat Bubble model**, exhibited on water at Port Canto for the 2024 Cannes Yachting Festival.
4. Acquisition of Neocean technology for the Flight Control System in June 2024.
5. **International deployment** of the company's efforts with help from an ecosystem of local, European and international partners. SeaBubbles has just **opened an office in Switzerland** on the shores of Lake Geneva in Bellevue, in the Canton of Geneva.
6. Development of a training and pilot centre: the **SeaBubbles Academy**.
7. **Green transition:** SeaBubbles participates in collaborative competition as part of the **Coq Vert** community, an initiative launched by Bpifrance, in partnership with the ADEME and the Ministry for the Ecological Transition. Coq Vert is a community of business leaders who are convinced of the need to act, and are already involved in the ecological and energy transition.

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