

SILVER CLOUD

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photography: Buggy Gedlek; Shaw McCutcheon; Abeking & Rasmussen

USING A TECHNOLOGY ENTIRELY NEW TO YACHT BUILDING IS A RISKY MOVE, BUT THE OWNER KNEW HE WAS IN SAFE HANDS WHEN HE CHARGED ABEKING & RASMUSSEN WITH FINDING A SOLUTION TO HIS WIFE'S SEASICKNESS ... AND THE SILVER CLOUD SWATH WAS BORN

There must be a thousand and one reasons for building a new yacht but the thinking behind one of the most technically interesting motor yachts to be launched for many years is a touchingly simple and personal one: the owner's wife gets seasick.

The 41 metre Abeking & Rasmussen expedition yacht *Silver Cloud* tackles that problem using SWATH (small waterplane area twin hull) technology and is believed to be the first substantial yacht of this type. Initial experience, including trials in the North Sea and an Atlantic crossing, has been promising and has encouraged the owner to plan a world cruise.

Alex Dreyfoos has been an enthusiastic yachtsman for many years while his wife Renate has been a slightly reluctant one because of her longstanding problem with motion sickness. For a number of years he competed in ocean races as navigator and could be sick in a storm like most people but also enjoyed the almost instantaneous relief that results from placing a foot on dry land. Renate is one of those unlucky people who can feel uneasy in almost any kind of vehicle and feels off-colour for a couple of days after a bad experience.

In spite of this, they cruised very widely in the first *Silver Cloud*, a 34.7 metre Burger motor yacht. Thinking that a larger yacht with better stabilisers would solve the problem, the Dreyfoos' then moved up to a 43.6 metre Feadship (formerly called *Cakewalk* and *Aussie Rules*) but were surprised to find that, if anything, the problem became slightly worse. The captain observed that from a charter group of 10, two or three people might typically feel unwell in quite moderate sea conditions.

Being a scientist by training, Alex Dreyfoos felt sure there must be a

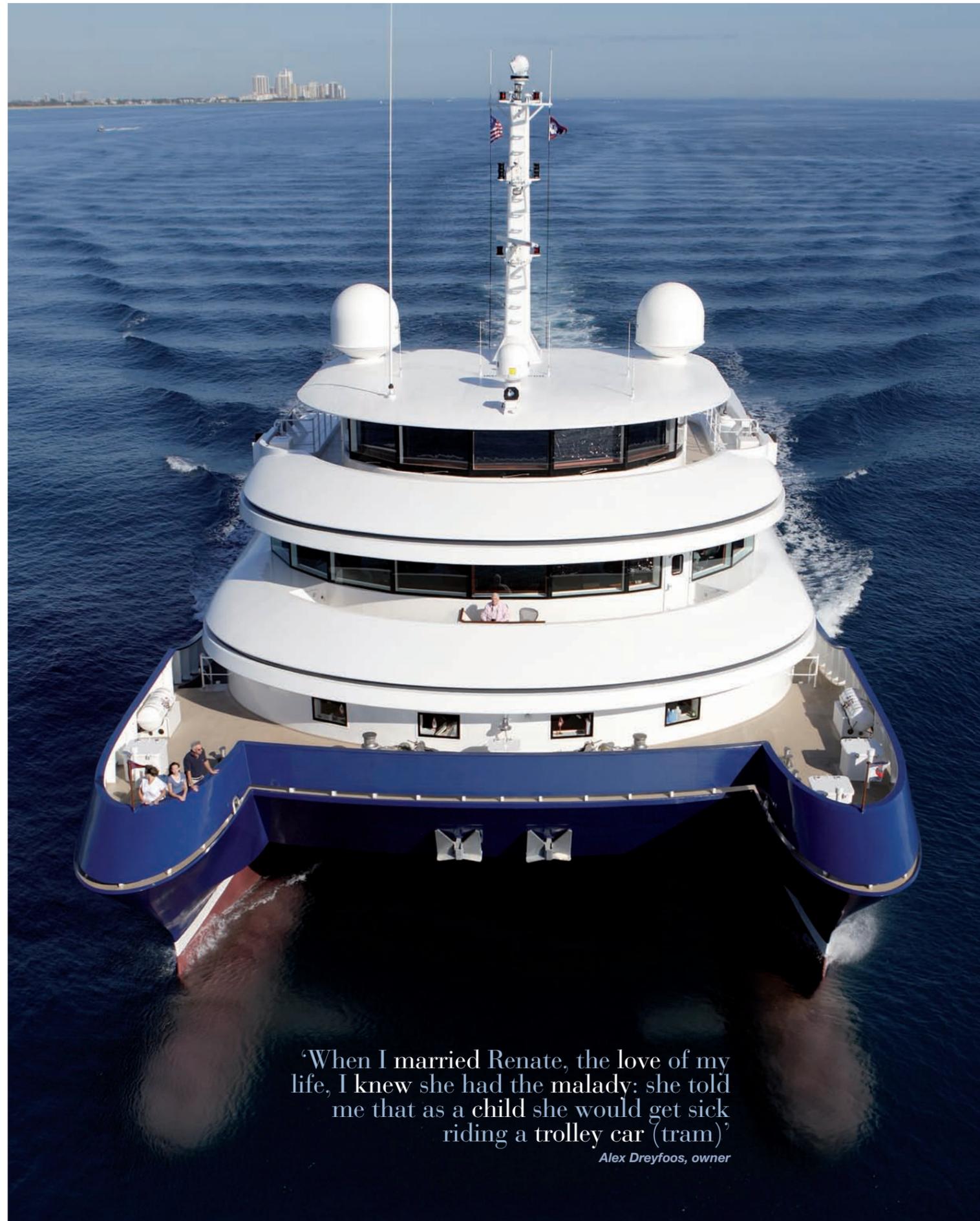
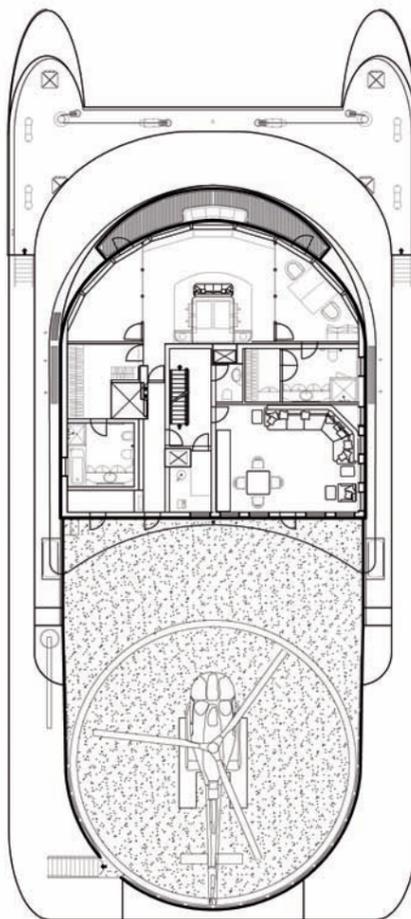
way to improve matters and was determined to find one if he could. By emailing builders of unusual craft, he got in touch with John Fulsang of North West Bay Ships, Australia, and it was he who first mentioned

SWATH, a term that Dreyfoos had not previously come across. Fulsang also suggested contacting John Adams, a former principal with Maritime Dynamics and now with Seakeeper, manufacturers of gyro stabilisers for small power boats. (Not to be confused with SeaKeepers, of which Alex Dreyfoos is a founder member). Adams became a close friend and technical adviser and deserves a lot of credit for *Silver Cloud* being as stable as she is.

The ideas behind the SWATH design date back to the 19th century and by 1946 a Canadian, Frederick Creed, was able to take out a British patent on his version. The US Navy became interested and carried out extensive design and test work in Hawaii from which Dr Tom Lang obtained a patent for a SWATH with additional stabilising fins. Just as importantly, the navy put a massive effort into design software, which later became available to purchase. This was crucial because without computer-aided design, a practical SWATH would hardly be possible. According to Dr Klaas Spethmann, technical director at Abeking & Rasmussen, a typical ship is developed through four to five versions to optimise the hull but *Silver Cloud* ran through 300 iterations, mostly because there are six different buoyant bodies involved.

Alex Dreyfoos found out that Abeking & Rasmussen was the shipyard that had delivered most SWATH vessels, having completed eight

since 1999, beginning with a 25 metre tender for the Elbe Pilots service. The pilots don't want to go alongside a ship in a tender larger or heavier than this which could cause impact damage and the SWATH held out the promise of exceptional seakeeping in a small vessel. As it turned



‘When I married Renate, the love of my life, I knew she had the malady: she told me that as a child she would get sick riding a trolley car (tram)’

Alex Dreyfoos, owner



“My observations and experiences triggered my interest in finding a better solution to sea sickness than “bigger is better””



out, this tender has been an outstanding success leading to further orders from pilots in Germany and Holland.

There is an astounding piece of video which shows a coastguard ship of about 50 metres in length pounding heavily to windward in a typical North Sea chop with solid water smashing over the top of the wheelhouse. Alongside it, the little red SWATH tender is scooting happily along with hardly any pitching or rolling and just light spray flying aft. There could hardly be a more convincing demonstration. When Alex and Renate Dreyfoos visited them, the Abeking & Rasmussen people arranged for them to take a trip on this tender on a rough day. As it fizzed along at 18 knots, Renate Dreyfoos was quietly getting on with some knitting. Apparently they had found the answer to their problem.

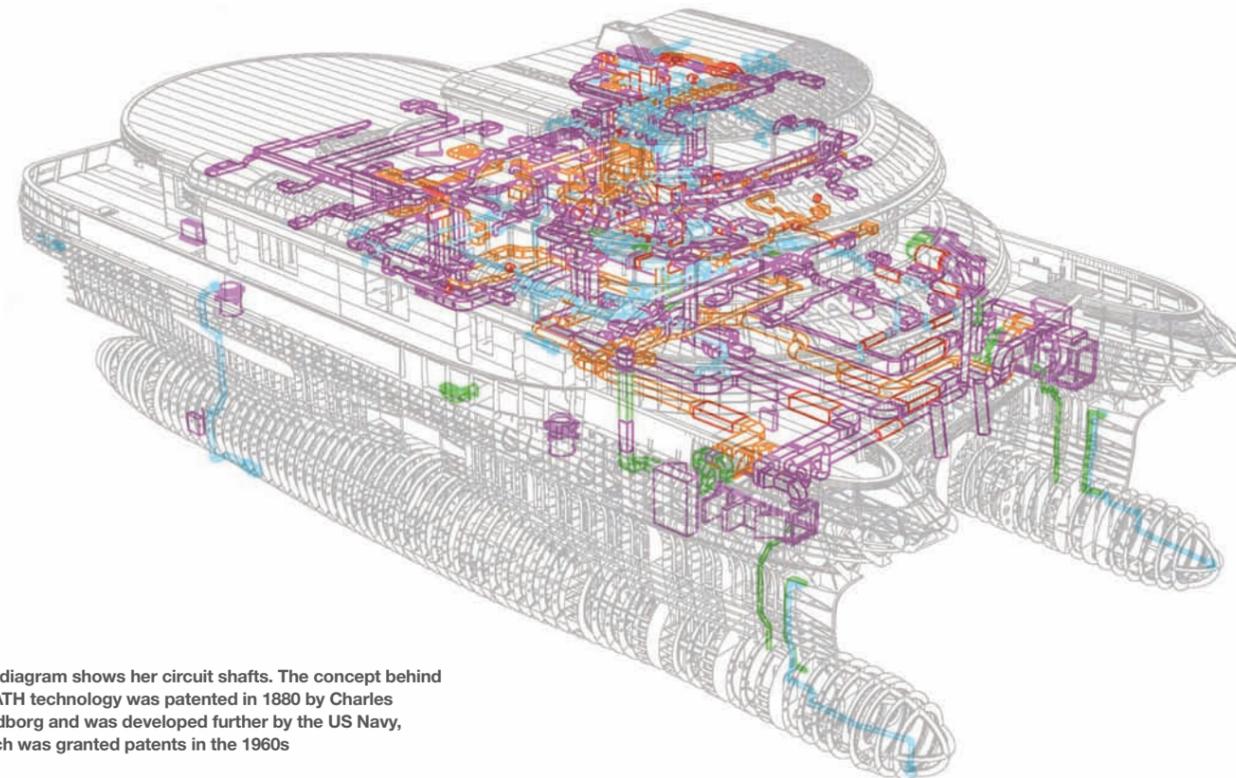
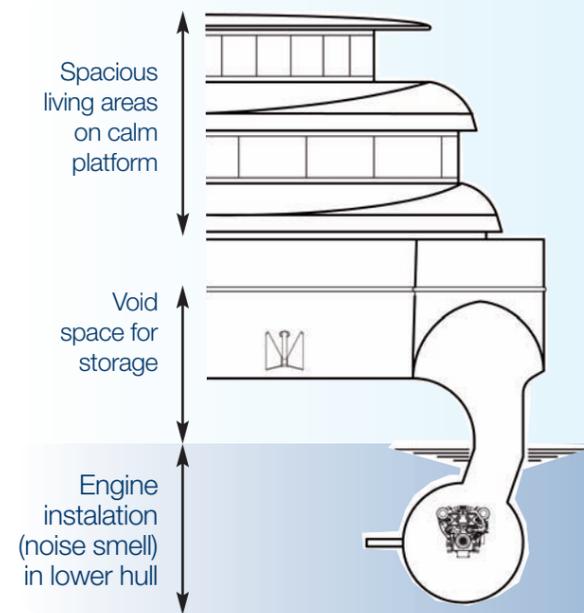
The observation that lies at the heart of the SWATH design is that waves only exist on the surface of the water. A short distance below the surface it is calm, something that scuba divers and submariners confirm. Therefore if a vessel can be designed so that most of its displacement is permanently below the surface, it will not be affected by waves. This

can be achieved if the vessel is supported on a pair of cylindrical hulls, a bit like small torpedoes, that are connected by slender struts to a platform on which the superstructure is placed. The struts are the ‘small

waterplane’ and they are slender so that the waves will affect them minimally. It has been found advantageous to divide the struts into two on each side so that the platform is supported from its corners like a car is by its four wheels.

Extensive experimentation showed that in an ideal layout, each torpedo carries 40 percent of the displacement while the remaining 20 percent is divided between the four struts. The actual dimensions depend on the size of the vessel but on *Silver Cloud* the torpedoes are 3.5 metres in diameter and run about 1.1 metres below the surface. From the water surface, there is a 2.1 metre air gap under the bridge deck and it is essential that it should be maintained so that wave tops don't smack it. Because the struts contribute so little to the buoyancy, weight control

is crucial and this is managed by water ballast tanks in the torpedoes. After establishing correct trim at the outset, as fuel is burned, it is replaced by fresh water from the watermakers so that weight remains the same.

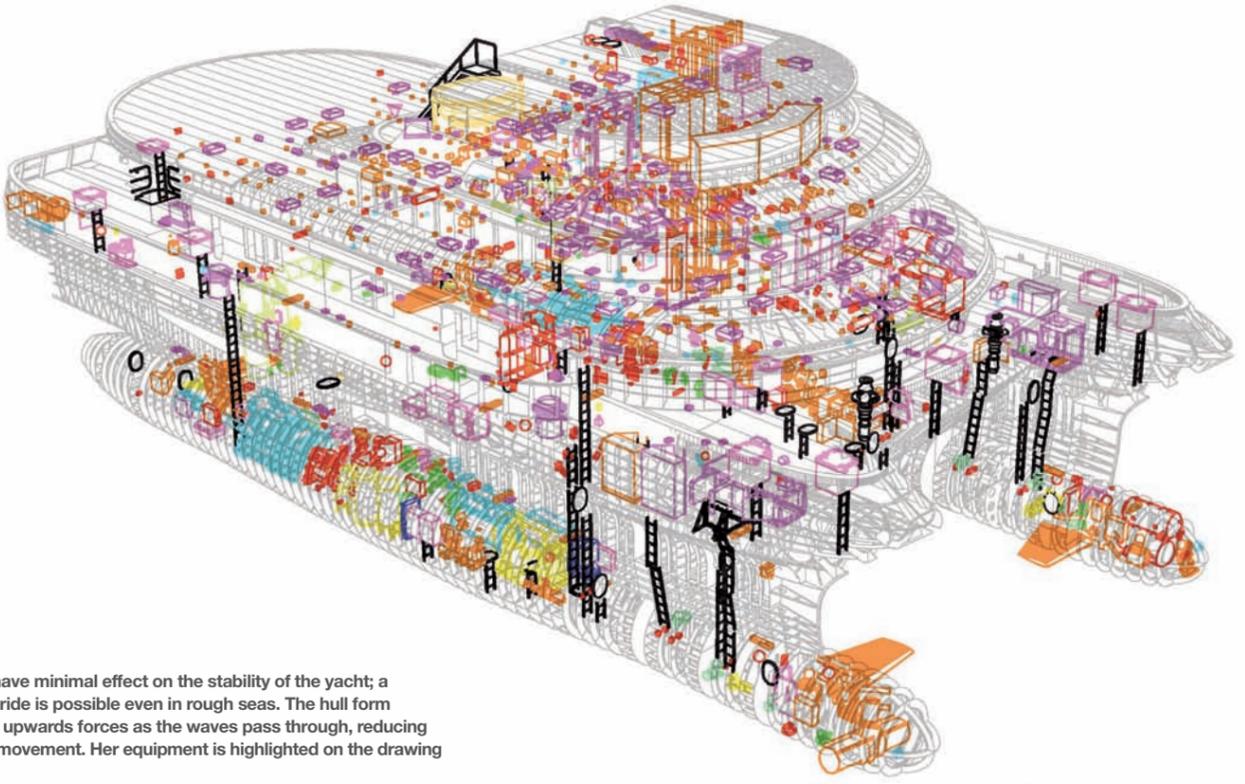


The diagram shows her circuit shafts. The concept behind SWATH technology was patented in 1880 by Charles Lundborg and was developed further by the US Navy, which was granted patents in the 1960s

The effectiveness of the SWATH design is much enhanced by gyro-referenced active fins which are fitted forward and aft on both hulls. These act a bit like the suspension of a car, smoothing out vertical accelerations caused by bumps and holes in the road. Using an advanced electronic control system, they can also fine-tune the response to waves, just as luxury cars can adjust their suspension from 'sport' to 'luxury'. The fin stabilisers fitted to conventional ships and yachts only act to suppress rolling; they do nothing to prevent pitching, slamming and heaving whereas the SWATH manages this particularly well.

The building contract for *Silver Cloud* was most unusual in that it specified the maximum vertical acceleration acceptable. For comparison, NATO naval vessels require a maximum of 0.2g rms (1g = force of gravity, rms = statistical average), a standard hardly ever achieved in practical operation by ships less than 100 metres in length. On trials in a two metre head sea, *Silver Cloud* recorded a dramatically smaller vertical acceleration of 0.035g rms. The roll angles were also very low at 1.2 degrees rms in beam seas.

Having breezed quickly through the theory, it is time to look at *Silver Cloud* as a yacht. The requirement was for a no-frills, long-range expedition yacht and this resulted in a length of 41 metres with a moderate power output of 1,600kW from a pair of Caterpillar C32 diesels, giving a top speed of well over 14 knots and a range of 3,900 nautical miles at 10 knots cruising speed. The engines and generators are installed inside the torpedoes, as are the fuel and ballast tanks. One advantage of the twin hull arrangement is that if there were an accident that resulted in a torpedo being flooded, the yacht would heel to about 12 degrees until it was supported by the bridgedeck and then be able to proceed slowly but safely to harbour using the other engine. In addition, on each torpedo hull



Waves have minimal effect on the stability of the yacht; a smooth ride is possible even in rough seas. The hull form reduces upwards forces as the waves pass through, reducing vertical movement. Her equipment is highlighted on the drawing



‘One Australian shipyard owner suggested I explore the SWATH design. That was the first time I had learned of the word applied to a boat design’



SILVER CLOUD

LOA

41m

LWL

37m

BEAM

17.8m

DRAUGHT

4.1m/3.5m

DISPLACEMENT

600 tonnes

ENGINES

2 x Caterpillar C32 820kW

PROPELLER

6-bladed, fixed

SPEED (MAX/CRUISE)

14.8/ 12.5 knots

RANGE AT 10 KNOTS

3,900 nm

FUEL CAPACITY

85,000 litres

BOWTHRUSTER

110kW

STABILISERSMaritime Dynamics International/
Abeking & Rasmussen**GENERATORS**2 x Caterpillar C9 160kW,
1 x Caterpillar 60kW**FRESHWATER CAPACITY**

68,000 litres

GREY/ BLACK WATER CAPACITY

16,000 litres

OWNER AND GUESTS

10

CREW

8

TENDERS7m Novurania custom line with
Volvo 190hp diesel, 4.5m
rescue boat**CONSTRUCTION**Steel hulls/aluminium alloy
superstructure**CLASSIFICATION**

Germanischer Lloyd 100 A5, MCA

NAVAL ARCHITECT

Abeking & Rasmussen

EXTERIOR STYLING

Abeking & Rasmussen

INTERIORSKirschstein Designs/ Susan
Schuyler Smith of Spectrum
Interior Design**PROJECT MANAGER**

Captain Stephen Martin

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Web: www.cnyachts.com**BUILDER/YEAR**Abeking & Rasmussen/ 2008
An de Fähr, Lemwerder, Germany.
Tel: +49 421 67330
Web: www.abeking.com

‘On a 25 metre pilot boat in sea conditions that would have had Renate seasick had we been on the Feadship, she was reading and knitting as I was learning about this unusual technology’

there are watertight compartments forward of the forward ballast tank and aft of the aft ballast tank. The immersed hulls are surprisingly spacious and one can walk around the engines and auxiliaries.

The twin hull layout gives an immense amount of deck space and *Silver Cloud* has roughly the same area and volume as a typical 50 metre motor yacht. Space is the greatest luxury afloat and she has masses of it, with big, uncrowded rooms throughout the accommodation. Alex Dreyfoos was very much in favour of a simple, practical expedition yacht and he decided not to go to the expense of hull fairing, while the decks are only partly teak laid and there is virtually no varnished woodwork on deck. Internally, there are attractive but simply furnished cabins and saloons with a notable absence of marble or gold.

The main deck offers an outdoor dining table set in the shade of the helideck, just outside the glass doors into the main saloon. Inside is an astonishingly large open space that is wider than it is long and incorporates two seating areas and two spacious dining tables. The furnishings are simple but comfortable and the walls are hung with large prints of the owner's own photographs. Moving forward on the main deck there are four guest cabins, two double and two twin, and these are quite unlike normal cabins, being more similar to hotel rooms with space to walk around and superb views from large square windows.

The galley and pantry are nearly on the centreline and right forward on the main deck are the crew quarters, using space that most yacht designers would love to get their hands on as a guest area. Stairs from the central hallway lead to the upper deck, roughly half of which is devoted to a helideck, fully certified for a 2.8 tonne aircraft and even if this is in place, there is plenty of room to store boats and set out sun

loungers. The forward section of this deck is devoted to the owner's suite which is truly remarkable, having a half-moon shape with large windows all around the forward curve giving views over nearly 180 degrees. For someone with even the slightest degree of motion sickness, it is important to be able to fix your eyes on the horizon and in this suite you can even do this while sitting up in bed. Opening aft from the bedroom are a pair of bathrooms and the owner's study. The remaining areas on this deck are an upper lounge or media room, which looks aft over the helideck, and a gymnasium.

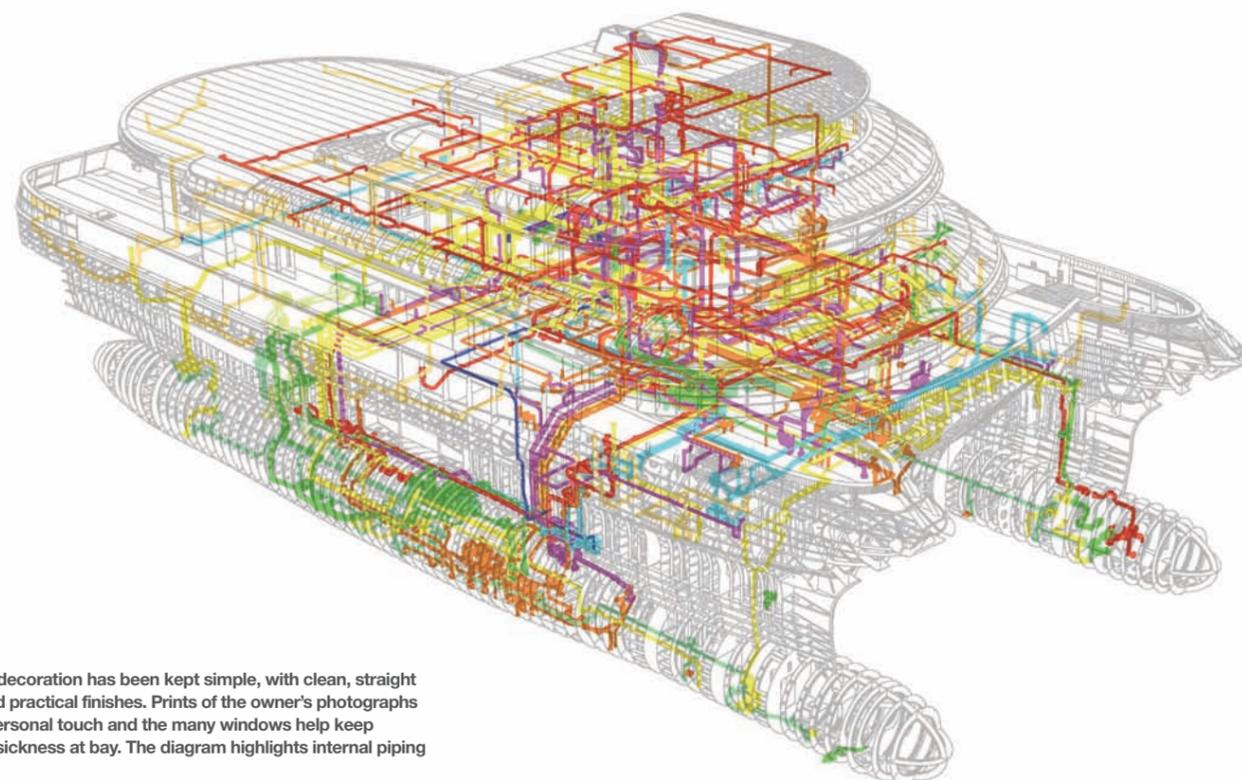
A very special feature is a doorway on to a forward-facing private deck, in the centre of which is a conning station so the owner can take control of his yacht without needing to move to the wheelhouse. A pair of high-resolution colour monitors, in addition to displaying all navigational instruments plus any of the extensive vessel monitoring information, can display the picture from any of the 11 video cameras aboard or – when at anchor – satellite television or Blu-ray movies. Furthermore, the computer in the owner's study can be remoted to one of these displays for outdoor computing in nice weather.

Up one more set of stairs brings you to the wheelhouse, which is also half-moon shaped as it is directly above the owner's suite. It has the outstanding degree of visibility that you might expect on something like a tugboat but seldom experience on a yacht. There is plenty of fascia and rack space as this vessel has a lot of electronics involving the control system, in addition to the normal navigation, communication and entertainment suites. The captain has a spacious en suite cabin right behind the wheelhouse.

On the port side of the lobby is an elevator to the top deck. This deck goes right around the superstructure and includes a spa pool and space



'We both became convinced that the SWATH design was the answer we had been looking for'



Interior decoration has been kept simple, with clean, straight lines and practical finishes. Prints of the owner's photographs add a personal touch and the many windows help keep motion sickness at bay. The diagram highlights internal piping



‘At no time was stemware upset and vases remained in place during the entire trip; quite a remarkable ride’

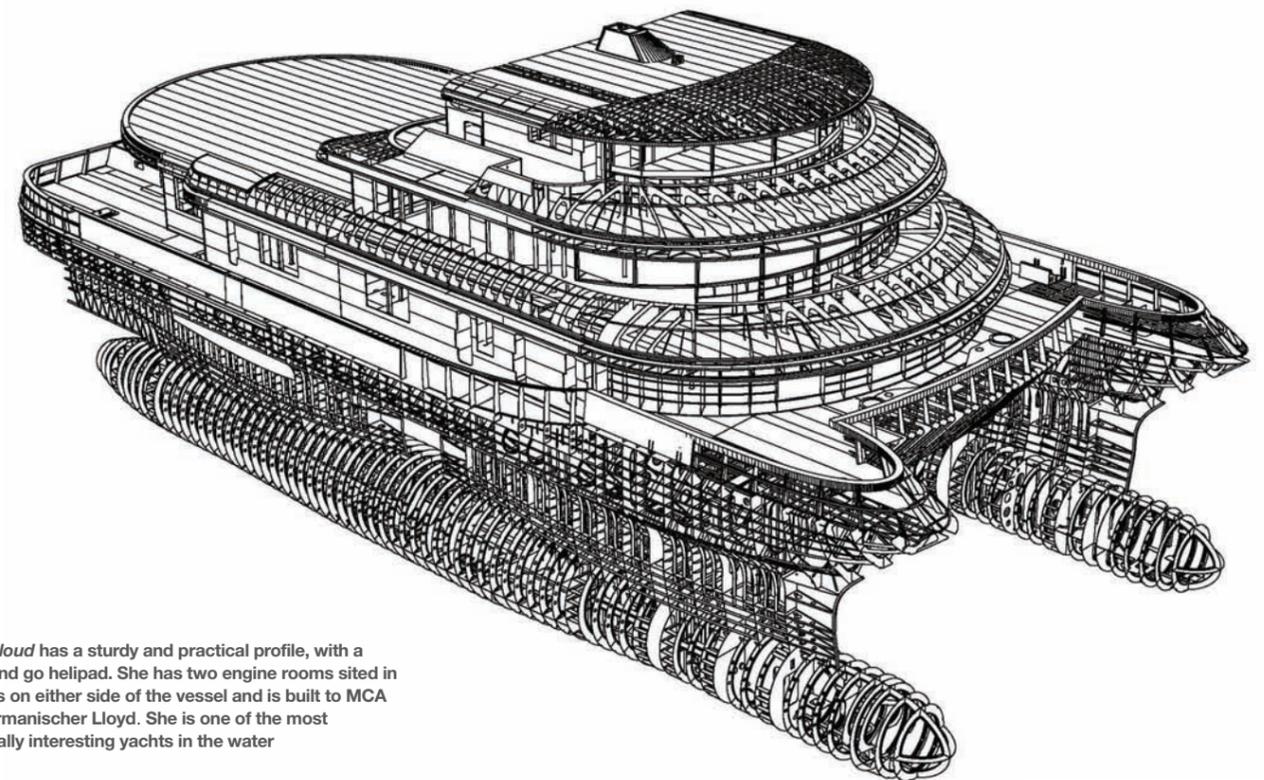


for seating while wing conning stations give the captain a full-length view of his vessel.

Trials in the North Sea proved very satisfactory and *Silver Cloud* then set off for Florida when it was found she would maintain 14 knots at 70 percent power in smooth water. Mrs Dreyfoos was aboard for a considerable part of the trip and felt more comfortable than on any of their previous yachts. They were astonished to find that tall wine glasses could be left standing on the table in two metre seas. After arrival in

Palm Beach, the yacht has been the subject of great curiosity with many people begging for a ride and after some minor rectification work was due to set off on a long cruise.

Probably the biggest disadvantage of the SWATH is the deep draught – 4.1 metres in the case of *Silver Cloud* – which can be reduced to 3.5 metres in harbour by pumping out the ballast. Even so, she is never going to be an ideal yacht for marina berthing but Alex Dreyfoos is content with the prospect of anchoring at most



Silver Cloud has a sturdy and practical profile, with a touch and go helipad. She has two engine rooms sited in the hulls on either side of the vessel and is built to MCA and Germanischer Lloyd. She is one of the most technically interesting yachts in the water



destinations. The SWATH principle continues to work at zero speed and *Silver Cloud* will never experience rhythmic rolling, so lying at anchor is comfortable, secure and cheap compared with berthing. The land will be reached in the tender, which is stored in a compartment under the aft main deck and drops into the water between the hulls. She is an unusual-looking yacht but no more so than many expedition vessels.

Some potential owners might shy away from what they would regard as an 'experimental' design but Abeking & Rasmussen are particularly proud of the fact that *Silver Cloud* is fully classed by Germanischer Lloyd and MCA. Abeking & Rasmussen estimate about 60 SWATHs have been built worldwide, of which 20 are in full use. Within this tiny fleet, they have built eight with eight more ordered, but so far, only one is a yacht. Maybe not for much longer

