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SILVER CLOUD

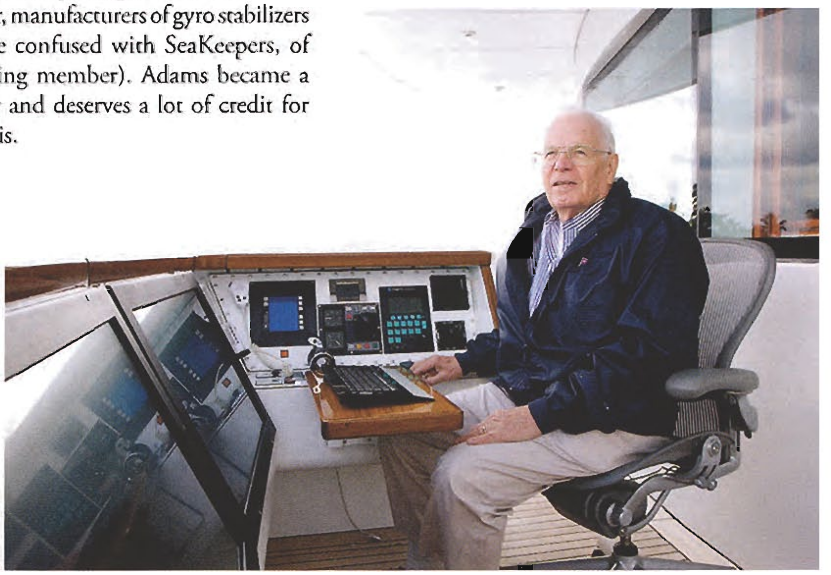
STORY: DAVID PELLY
INTERIOR PHOTOS: SHAW MCCUTCHEON
RUNNING PHOTOS: BUGSY GEDLEK

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 135ft Abeking & Rasmüssen expedition yacht *Silver Cloud* tackles that problem using SWATH technology and is believed to be the first substantial yacht of this type. The initial experience, including trials in the North Sea and an Atlantic crossing, has been very 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 long-standing problem with motion sickness.

In spite of this, the couple cruised very widely in their first *Silver Cloud*, a 114ft Burger. Thinking that a larger yacht with better stabilizers would solve the motion sickness issue, the Dreyfoos' then moved up to a 143ft Feadship (the former *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 ten, two to three people might typically be feeling unwell in quite moderate sea conditions. Being a scientist by training, Alex Dreyfoos felt sure there had to be a way to improve matters and became determined to find a solution.

By emailing builders of unusual craft, he got in touch with John Fulsang of North West Bay Ships in Australia, who introduced Dreyfoos to the SWATH terminology. Fulsang also introduced Dreyfoos to John Adams, a former principal with Maritime Dynamics and now with Seakeeper, manufacturers of gyro stabilizers for small power boats (not to be confused with SeaKeepers, of which Alex Dreyfoos is a founding member). Adams became a close friend and technical adviser and deserves a lot of credit for *Silver Cloud* being as stable as she is.



WITH MOST OF THE VESSEL'S DISPLACEMENT PLACED BELOW THE WATER'S SURFACE, A SWATH-DESIGNED YACHT CAN AVOID BEING AFFECTED BY WAVES.

The spacious main deck begins aft with an outdoor dining area shielded overhead by the helideck. Inside, the wide saloon includes two sitting areas and two dining tables.

The ideas behind the Small Waterplane Area Twin Hulls (SWATH) design date back to the 19th century, and by 1946, 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 stabilizing fins. Just as importantly, the Navy put a massive effort into design software, which later became available to purchase.

The creation of this software was crucial because without Computer Aided Design, a practical SWATH would hardly be possible. According to Dr. Klaas Spethmann, technical director at Abeking & Rasmüssen in Germany, a typical ship is developed through four or five versions to optimize the hull, but *Silver Cloud* ran through 300 iterations, mostly because there are six different buoyant bodies involved.

Alex Dreyfoos discovered that Abeking & Rasmüssen was the shipyard that had delivered the most SWATH vessels, having completed eight since 1999, beginning with an 82ft tender for the Elbe Pilots service. Coming alongside a ship in a tender larger or heavier than this could cause impact damage, and the SWATH promised exceptional seakeeping ability in a small vessel.

There could hardly be a more convincing demonstration for Dreyfoos than a video showing a Coastguard ship of about 164 feet 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. Alex and Renate Dreyfoos arranged for a visit to A&R and a trip on this tender on a rough day. As it fizzed along at 18 knots, Renate Dreyfoos was quietly sitting 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, somewhat like fat torpedoes, that are connected by slender struts to a platform on which the superstructure is placed. The struts are the "small waterplane" and are only minimally affected by waves. 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 11 feet and 6 inches in diameter and run about 4 feet below the surface. From the water surface, there

is a 7ft air gap under the bridge deck which must be maintained to ride above the wave-tops. 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 exactly the same.

The effectiveness of the SWATH design is much enhanced by gyro-referenced active fins that 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 stabilizers 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. In 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 328 feet in length. On trials in a 7ft 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.

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 135 feet, 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. 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 bridge deck, and then be able to proceed slowly but safely to harbor using the other engine. In addition, on each torpedo hull 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 164ft motor yacht. Space is the greatest luxury afloat and *Silver Cloud* has masses of it, with big, uncrowded rooms throughout. Alex Dreyfoos was very much in favor 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 centerline 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-ton 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 owners' 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 compartments on this deck are an upper lounge or media room, which looks aft over the helideck, and a gym.

A very special feature is a doorway onto a forward-facing private deck, in the center 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 color monitors,

The fully certified helideck can accommodate a 2.8-ton aircraft and still store tenders and sun loungers.

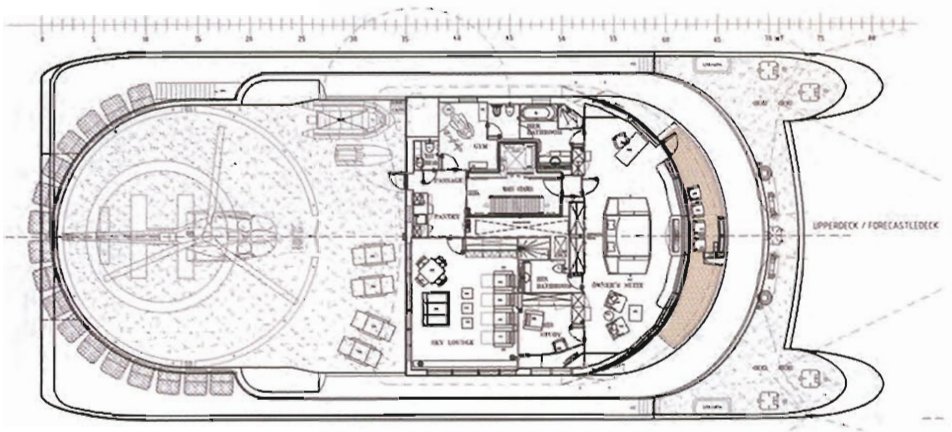
A CONNING STATION IS SITUATED OFF THE OWNER'S STATEROOM, ALLOWING HIM TO MAN SILVER CLOUD WITHOUT MOVING TO THE WHEELHOUSE.

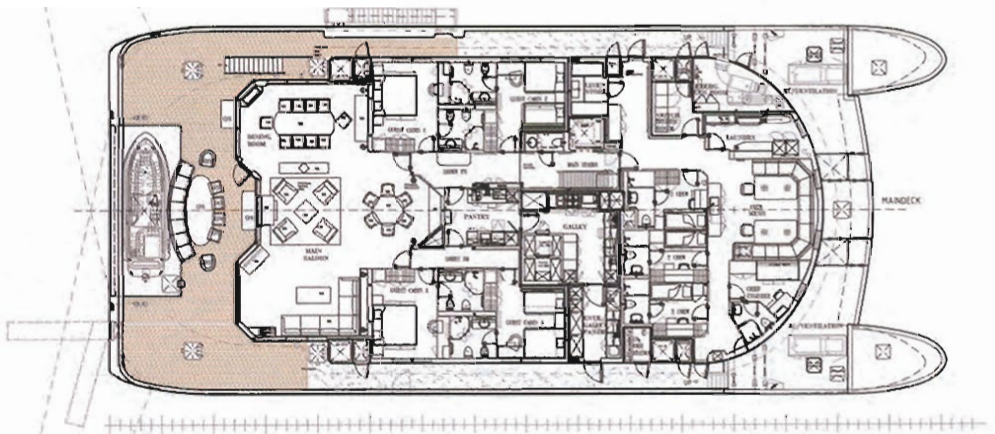
in addition to displaying all navigational instruments plus any of the extensive vessel monitoring information, can display the picture from any of the eleven video cameras aboard or – when at anchor – satellite television or Blu-ray movies. Furthermore, the computer in the owners' study can be remoted to one of these displays for outdoor computing in nice weather.

Up one more set of stairs brings one to the wheelhouse, which is also half-moon shaped being directly above the owners' suite. It has the outstanding degree of visibility that one 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 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 7ft seas. After arriving in Palm Beach, the yacht was 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 draft – 14 feet in the case of *Silver Cloud* – which can be reduced to 12 feet in harbor 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 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 to berthing.

Entering the engine room may come as a surprise, for it is accessed by a vertical ladder that descends nearly 13 feet below the water surface.

The land will be reached in the tender, which is stored in a compartment under the aft bridge 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 & Rasmüssen is particularly proud of the fact that *Silver Cloud* is fully classed by Germanischer Lloyd and MCA. Abeking & Rasmüssen estimates that about 60 SWATHs have been built worldwide, 20 of which are in full use. Within this tiny fleet, A&R has built eight, with eight more ordered, so far, only one is a yacht. Maybe not for much longer! |

SPECS

LOA: 134ft 6in (41.m)
LWL: 121ft 5in (37.m)
Beam: 58ft 5in (17.8m)
Draft (cruise/harbor): 13ft 5in/11ft 6in
Displacement: 661 tons
Engines: 2 x Caterpillar C32 820kW
Propellers: 6-blade, fixed
Speed (max/cruise): 14.8/12.5 knots
Fuel capacity: 22,455 gallons
Range: 3,900nm @ 10 knots
Bow thruster: N/A
Stabilizers: Maritime Dynamics International/ Abeking & Rasmüssen
Generators (main/emergency): 2 x Caterpillar C9, 160kW/1 x Caterpillar 60kW
Watermakers: 2 x HEM 4,227gpd
Freshwater capacity: 18,000 gallons
Grey/Black water capacity: 4,227 gallons
Sewage system: Hamann
Fire-control systems: Minimax
Security systems: N/A
Monitoring system: Interschalt Vista
Air-conditioning: Drews
Communication/Navigation electronics: Radars: Raytheon; Autopilot: Raytheon Anschutz; Depth sounder: Elac; Gyro compass: Anschutz; SSB: Sailor; Satcom: Inmarsat C & F77
Entertainment systems: Satellite TV, Seatel aerial, Samsung TVs. Central distribution of internet, Blu-ray disc and regular DVD with extensive music and video library.
Owner and guests: 10
Crew: 10
Tenders: 23ft Novurania Custom Line with Volvo 190hp diesel; 15ft rescue boat
Tender-launching system: Under-deck hoists
Passerelle: Yacht Tech, Ltd.
Paint: International
Construction: Steel hulls, aluminum alloy superstructure
Classification: Germanischer Lloyd 100 A5, MCA
Project manager: Captain Stephen L.Martin
Naval architecture: Abeking & Rasmüssen
Exterior styling: Abeking & Rasmüssen
Interior design: Kirschstein Design/Susan Schuyler, Spectrum Design
Builder/Year: Abeking & Rasmüssen /2008
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