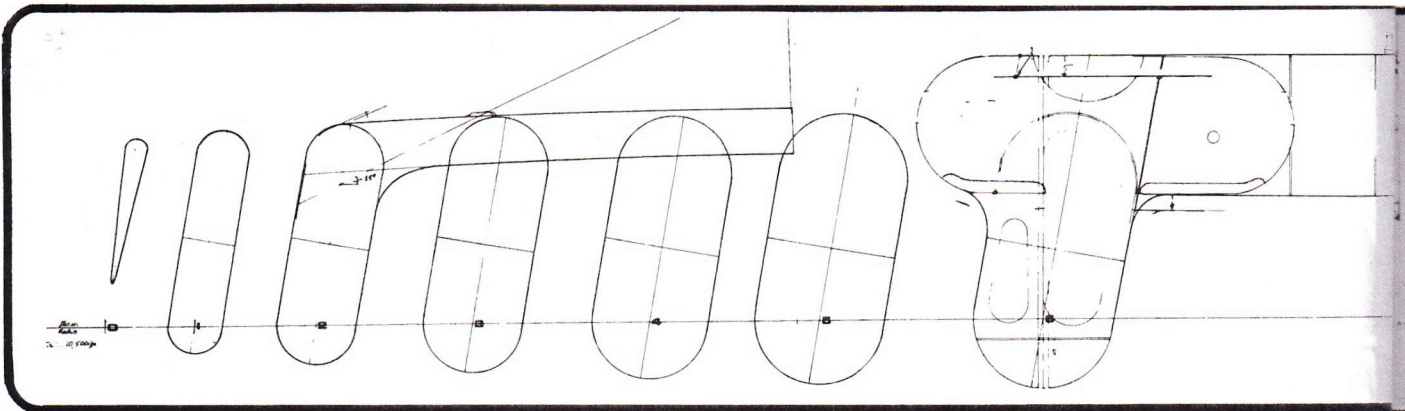
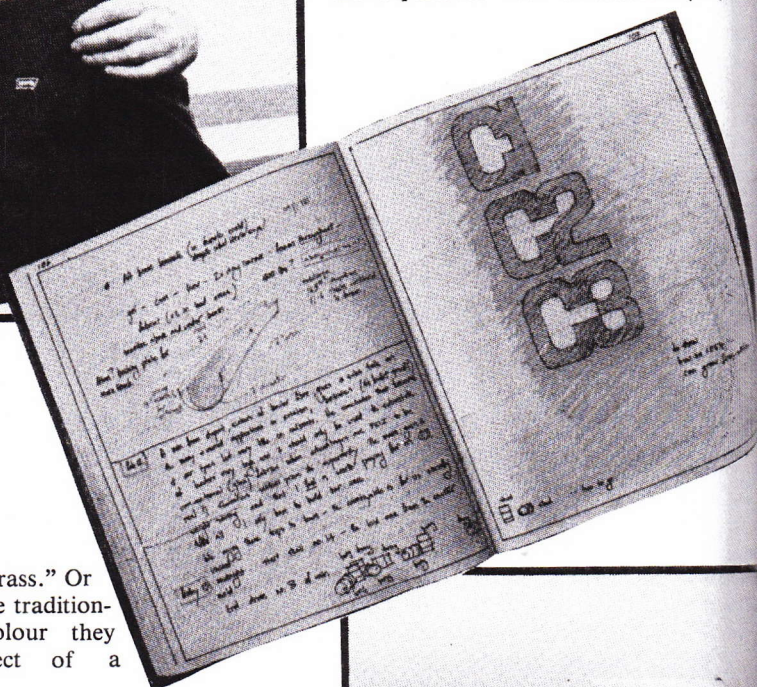




Top: Sundreamer hull stations. Above: David and Fiona . . . three years in a caravan, seven days a week working in the shed. Right: Progression . . . C1 through C2 to C3, pages from David's logbook on the development of Sundreamer, from dream to reality. Below: Emerging from the haybarn . . . "a bit thin for three years' work", said David's father. Stratosphere came from the same shed on Gordon Miller's farm back in 1978



THE launching was on a typical 1983 summer's day — grey, windswept and drizzling. The helpers were eager to rip out the back wall of the shed, while the farmer, Gordon Miller, was just as keen to get the iron back on again before it blew away.

With Gordon driving the tractor, *Sundreamer* emerged from the haybarn. "Looks a bit thin for three years' work," said David's father.

Protected by fibreglass skids made from the mould, *Sundreamer* rode surrealistically through the paddocks, herding sheep in front of her on an 800-metre slide to the river. Her bold lettering styled after *Omni* magazine, she looked as though she had escaped from its pages. Painted glossy white with large pink and small grey stripes — "Just for the trip across the farm; pink looks so good

against the grass." Or was it for the traditionalists, a colour they might expect of a multihull?

The catamaran had filled the barn to such an extent that it had been impossible to get a good look at her lines. Now she appeared as a magnificent piece of 21st century sculpture, dramatic in her simplicity, the blending of a purist's vision with the most sophisticated materials technology.

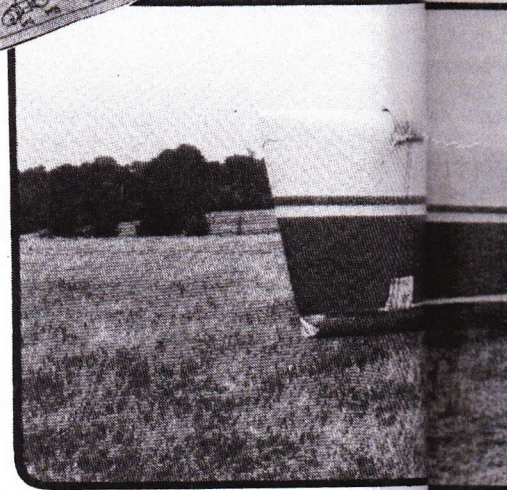
To David and Fiona from the moment *Sundreamer* left the shed she had visibly shrunk from the massive object that had dominated their lives for three years, living in a caravan on the farm, working in the shed often seven days a week.

With leis draped over her bows, *Sun-*

dreamer reached the river bank. There was a potentially disastrous moment when one hull was nearly airborne over the bank and the tractor dug itself deep into the mud. But on the second approach she slid smoothly down the bank to squat rather unceremoniously on the mud among the mangroves to wait for the midnight tide.

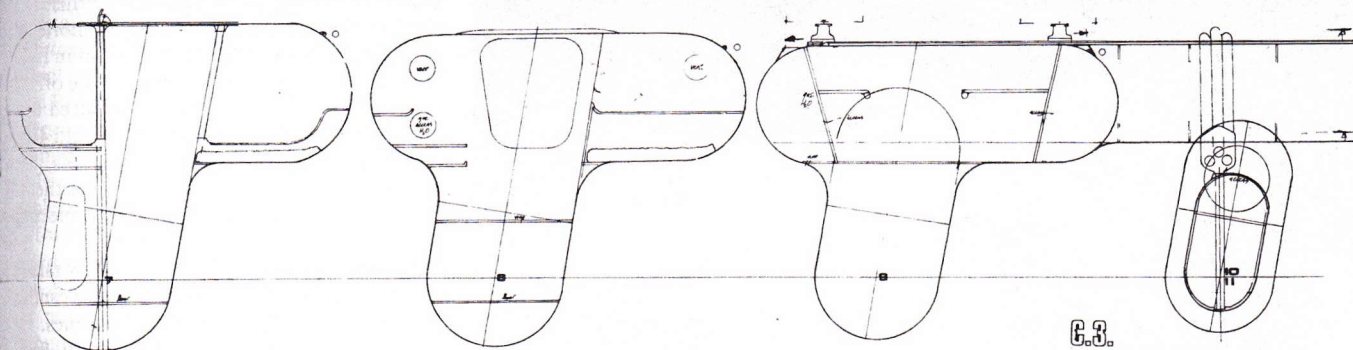
A few days later, when the weather was fair, she was towed down to Auckland to have the mast fitted.

Sundreamer (C3) is the ultimate development of David's multihull concepts based on his experience with *Sundancer* (C1) and



SEA SPRAY — April, 1983

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Stratosphere (C2). She is a totally functional sailing structure. About the only concession to appearance rather than performance is in the rake of the bows.

David built *Sundancer* in Sydney because, in the pre-fibreglass boom days of 1968, it was impossible to buy large quantities of resin here without an import licence. *Sundancer* was the second one-off foam sandwich boat built in Australasia and many different systems were tested to get the right foam and fibreglass combination.

Built outside over a particularly wet 14 months, David was determined never to build without shelter again. Which is partly why *Sundreamer* came to be built in a corrugated iron shed in Matakana, North Auckland. And, by a strange coincidence, this time instead of having to shift countries to obtain materials, the Kevlar and Klegecell foam actually came to C3, supplied by the New Zealand agent, who lived locally, from his barn down the Matakana Road.

Sundancer sailed into Auckland in 1970 and proceeded to beat up the Auckland fleet including the 73-foot *Buccaneer*. She still holds many course records, including the Balokovic Cup in 10hr 10min 46sec and Auckland to Suva in 5 days 10 hours (1150n miles).

With six years experience sailing *Sundancer* on many ocean voyages, David wanted his next design to achieve high average speeds ocean sailing rather than the peak speeds *Sundancer* reached while racing inshore.

After several years of preliminary sketches, *Stratosphere* (C2) was drawn up in 1973 for Gordon Miller, a farmer with a preference for the unconventional. Miller and boatbuilder Kevin Barnard built C2 under David's supervision.

Stratosphere was designed as a 61ft 6in (18.7m) offshore catamaran with sail area, displacement, crew and accommodation based more on a 42ft (12.8m) cruising cat. Length in the water and stability dimensions were maximised and no concession was made to IOMR ratings.

Lightness was a priority not just for speed but because "the greatest single structural threat to large multihulls comes from within in the form of moments of inertia".

Simplicity was also sought overall and in detail and was achieved with the use of an innovative modular system using the same female mould to produce 12 major hull com-

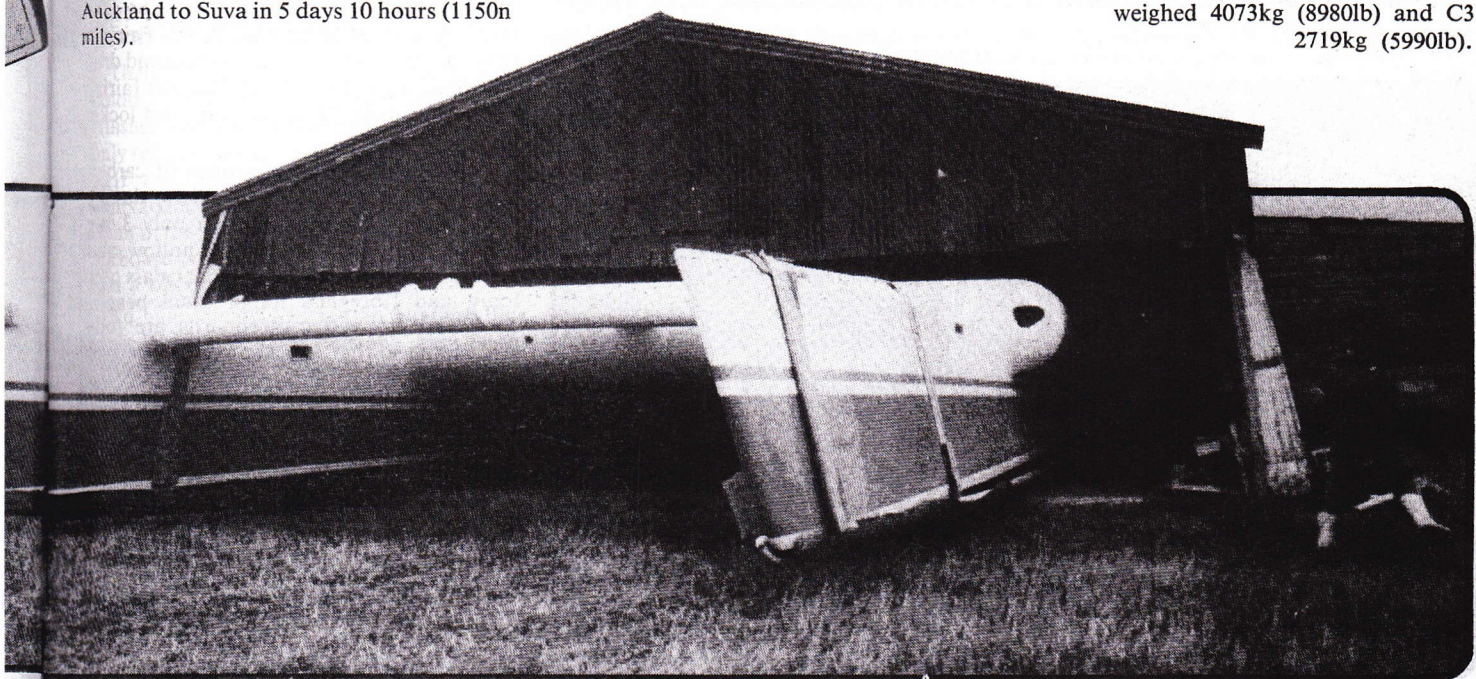
ponents. The module shape is carefully contrived so as not to compromise the structural and hydrodynamic effectiveness of the hulls.

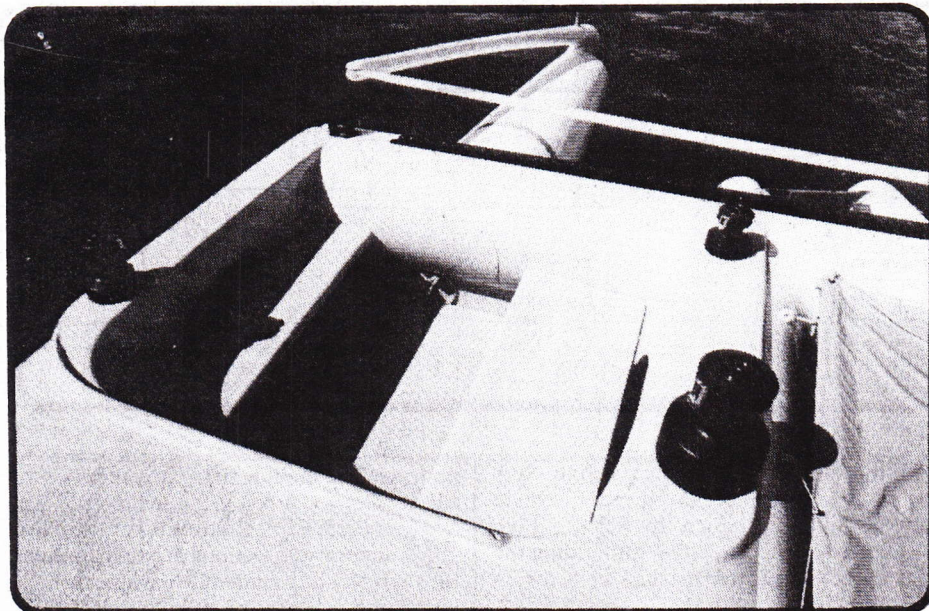
All underwater sections are semi-circular for strength and to minimise the already huge wetted surface areas of hulls 20 times longer than wide.

Following the launching of *Stratosphere* in 1978, David looked at ways of improving the design and structural details for C3. One significant change was the use of Kevlar fibres, which are lighter than glass laminate for the same strength characteristics. Where woven roving glass had been used in C2, Kevlar was substituted. Because of the enormous total hull surface area involved (280m² or 3000sq ft) this, together with a reduction in scantlings and size, saved more than 30% in hull weight from C2 to C3.

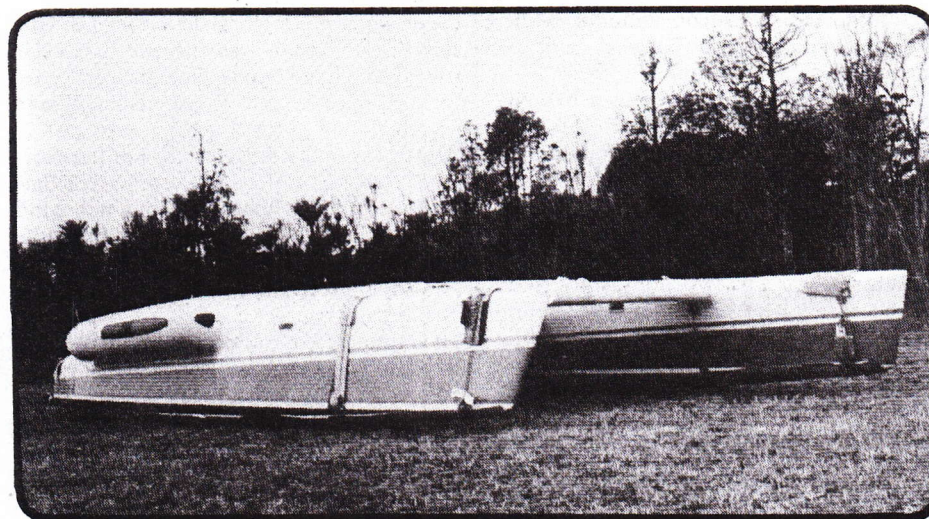
Also contributing to lightness is that C3 was literally hand-crafted rather than built. The laminate was tailored with meticulous care and structurally designed by David as he went along with the insight of any yacht designer building his own boat. A typical laminate on C2 was 80.5oz/yd, on C3 just 60.4oz/yd.

At the same construction stage, C2 weighed 4073kg (8980lb) and C3 2719kg (5990lb).

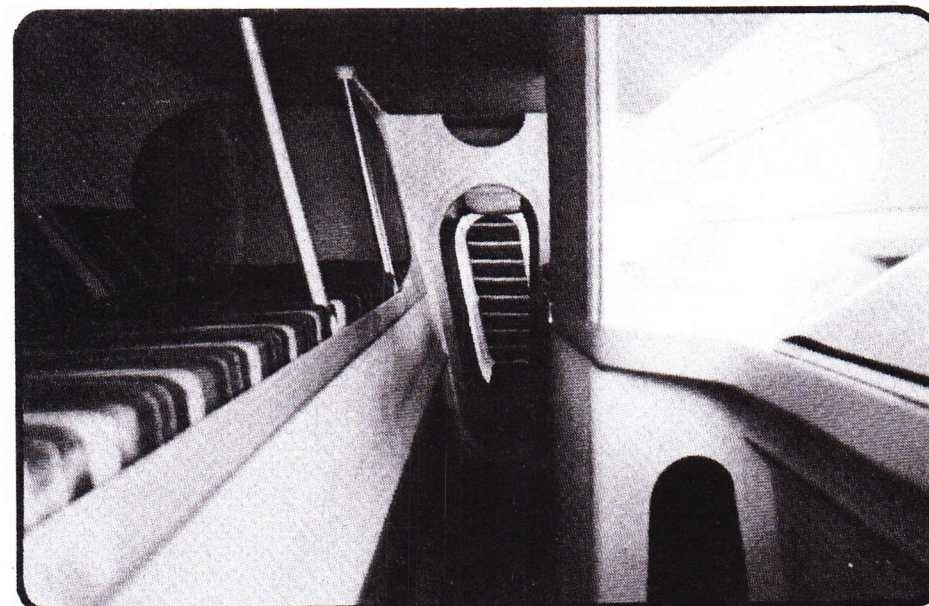




Above: Starboard cockpit and tiller. Every detail — even corners under the cockpit seats, which can be seen from inside the cabins, had to be just right. Below: Pink and grey stripes to match the traditionalists' expectations from a multihull



Below: View for'ard in the starboard hull. Note pod to right and, top left, entrance to the 3ft diameter crawlway connecting the hulls and forming part of the main beam



Sundreamer came from the same female modular mould as *Stratosphere*, this time used 14 times over. The hulls were shortened by fitting a plate in the mould 1.4m in from the transom and a further 10cm came off the bow. Height of the hulls was reduced 8cm by lowering the top edge of the mould 4cm. Whereas C2's hulls are vertical, C3's, like *Sundancer's*, are canted in 10° for aesthetics and to shorten the length of the connecting beams without reducing stability.

Beam was reduced 1.1m overall by taking 23cm off the pods, a further 23cm by canting the hulls and 30cm off the centrelines.

The hulls are an incredibly thin 8mm (5/16in) solid laminate of Kevlar and unidirectional glass with foam core bulkheads supported on 203mm (8in) top-hat sections. High compression areas under the mast and winches are backed with ply pads. Foam core is used for sound-proofing and insulation in the accommodation sections.

The hulls are connected by three beams, the main one made up of two 914mm (3ft) diameter tubes and designed to take all loads if the other beams fail. One of the tubes provides extra bunks and an interior crawlway between the hulls.

The forebeam (a 305mm, or 12in, diameter laminate) and aft beam are arched for aesthetic and structural reasons.

The aft beam David considers to be more important overall as being near the extremities of the hulls it has to take more wracking and bending stresses than the main beam. This 610mm (2ft) diameter tube is made up of Kevlar, unidirectional glass, foam core and top-hat and has the overall effect of diagonally stiffening the hull structure.

A static hull torsion test showed considerably less deflection than the bigger *Stratosphere*.

The huge trampolines which connect the hulls provide expansive sail-handling platforms. They are lashed to the hulls by edge pockets fitted over the PVC tubes. Fairings over the forebeam reduce windage and drag when tacking head to wind. The soft fairing behind the main beam is a giant wet locker and sail bin.

Rudders and tillers are made of carbon fibre over foam cores. The tillers, despite their 3.3m (11ft) length weigh only 3.6kg (8lb) each. Centreboards are hollow and made of Kevlar and unidirectional glass over foam and fibreglass longitudinal beams. Both rudders and centreboards are fully retractable so that *Sundreamer* can be kept in a mud berth.

As David believes in the continuity of material leading to a continuity of strength, he and Fiona have gone to amazing lengths to create everything they could from foam and fibreglass. They devised ways of arching beams and curving tillers which could be included in "101 uses for a cardboard tube". And, despite the labour intensity of the construction compared with slapping in some plywood, all the interior is foam core, including bunk bases, shelving, benches and

SEA SPRAY — April, 1983

fiddle rails in pleasantly curved shapes.

The twin cockpits provide dual helming and sail sheeting and the cabins dual living. *Stratosphere* has proved that this has both social (tea and symphony on starboard, beer and Roxy Music on port) and sailing advantages as during long ocean legs the crew tends to migrate to the windward hull.

For this reason, the galley and navigation table are interchangeable on *Sundreamer* as off-watch crew will use bunks in the windward pods. This is a useful way of getting the crew weight in the right place, bearing in mind that one person's weight gains around 4067 Joules (3000ft/lb) of stability. Also, keeping the crew below decks when racing lessens windage — another important factor in a yacht capable of sailing at such high speeds.

When David sailed *Sundancer* life on board was as uncluttered as her lines. There was a two-burner stove and plastic bowl for washing-up, a port in the floor for wastes (often inadvertently dropped into the inflatable lying below) and water and food stored in plastic containers. The cabin was lit by oil lamps and the head was a bucket on a line in the port hull.

Now, 13 years on, his concessions to mid-life comforts are few. In fact it is the absence of the usual trappings that is his comfort, avoiding the typical skipper's fate of "you all go ashore and have a great time while I stay on board and unblock the loo and fix the freezer".

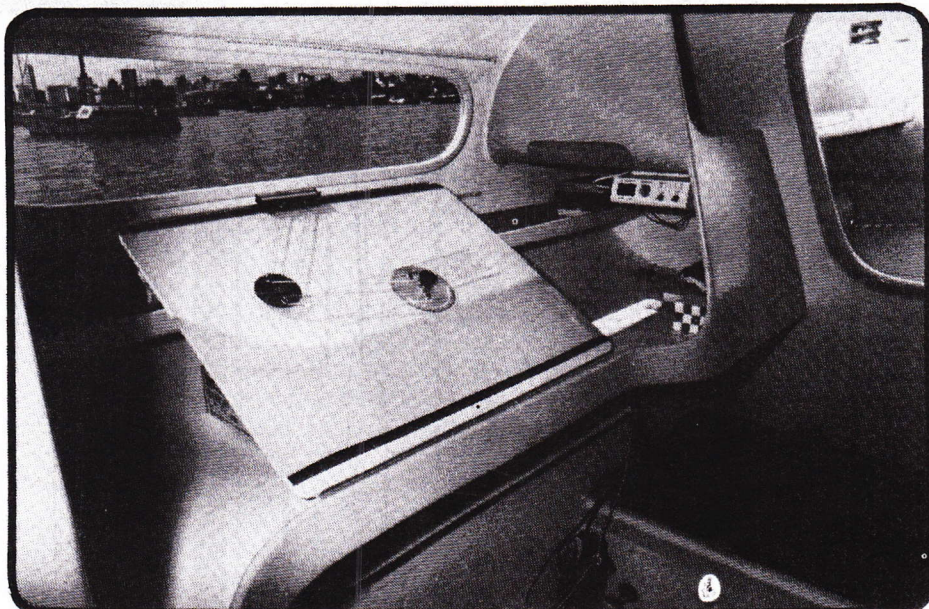
Sundreamer is carpeted and the squabs are a couple of inches thicker and cotton-covered rather than *Sundancer's* sticky vinyl. The galley hasn't changed but there's a different waste disposal problem. Toothpaste swills going down the drain in the pod splatter the port hull leaving seagull streaks on the paintwork. Water is still stored in plastic containers which double as movable ballast. Shifting 23kg (50lb) of water to the windward hull equals about 1350 Joules (1000ft/lb) of extra stability.

There's no plumbing, but a chemical holding tank toilet may be conceded when cruising with more delicate friends. There are only seven electrical switches, for dual logs, VHF transmitter, navigation lights, cabin lights (concealed neon tubes) and the engine room in the starboard hull fitted with a 9.9hp outboard (supercharged with a bilge blower) and a bilge pump.

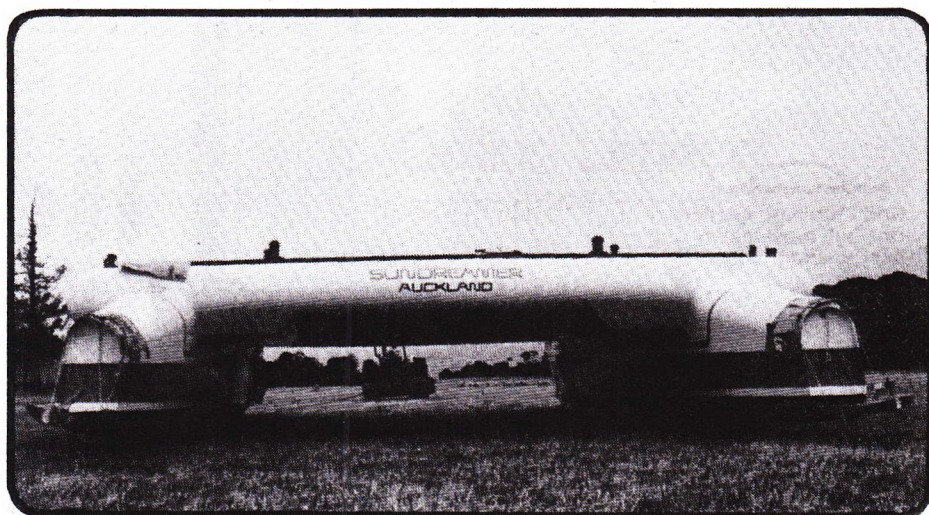
To have or not to have an auxiliary has caused more discussion than any other aspect of the boat so far. And whether it warrants the effort of making the skin fitting or ends be used for manoeuvring only when there is no wind. David's seamanship is simply to go to wind. David's seamanship is simply to go to anchorages where he can sail out at all times.

Hopefully, though, the 9hp wonder will help avoid some of the more ignominious occasions I remember on *Sundancer* when, zapping home through the keelers, the wind would die, leaving the tide to wash us backwards out of the harbour.

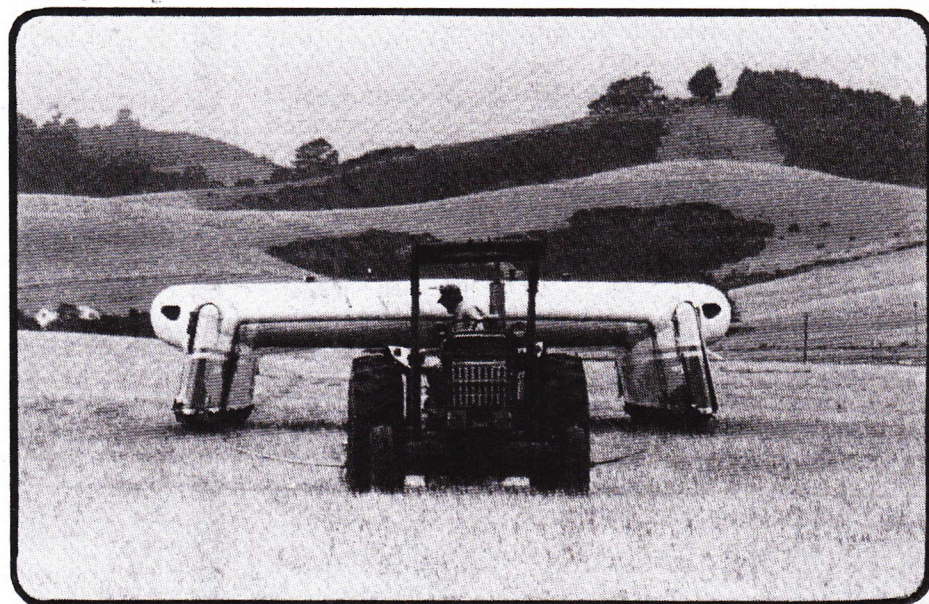
SEA SPRAY — April, 1983

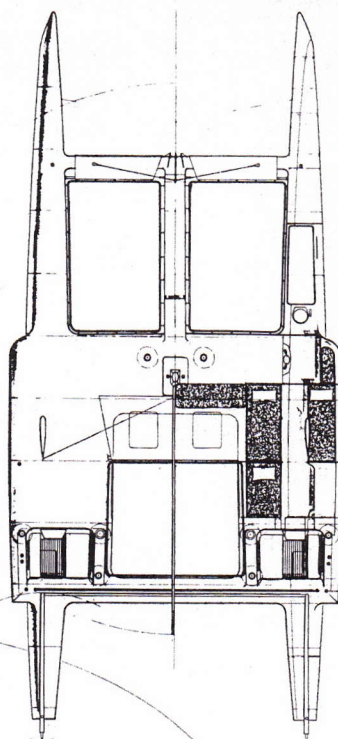
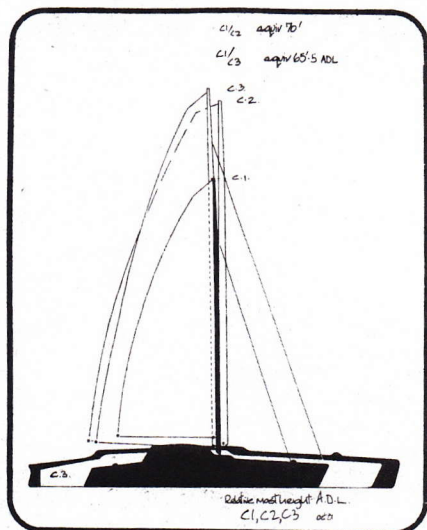


Top: Navigator's table set up in the starboard hull immediately forward of the cockpit. Like the galley, the table and other navigational needs can be switched to the port hull if necessary. Below: View from aft (minus rudders). Note GRP skids

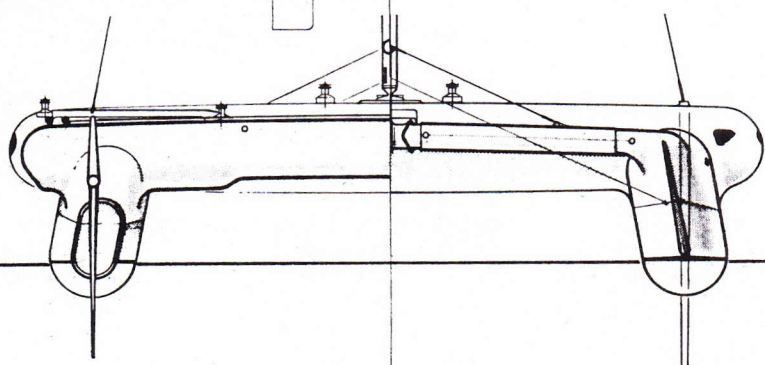
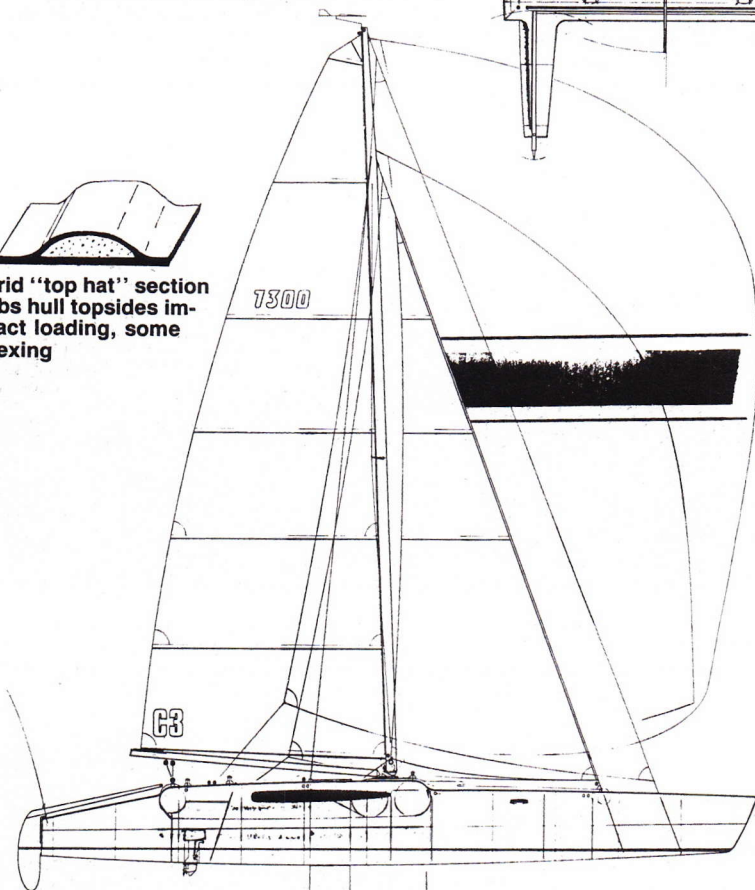


Below: Gordon Miller, who built and owned *Stratosphere*, handled the tractor as *Sundreamer* made her 800-metre slide to the river, herding the sheep ahead of it as they went





Grid "top hat" section ribs hull topsides impact loading, some flexing



However, it is significant to note that *Stratosphere* started out with twin outboards and ended up with a Cortina engine!

Stratosphere raced two seasons in Auckland and proved a fast boat in longer races. In 1981 Miller cruised her to the United States where she was eventually sold in Florida late last year. She is now heading for her new home port in the Philippines.

At time of writing, *Sundreamer* was berthed at Westhaven in the final stages of fitting out. David's real purpose with *Sundreamer* is not quite as dramatic or spectacular as she looks. He has no immediate plans to blast off into the ocean, although some day he would like to compete in such series as the Australian offshore multihull races and attempt some record passage times — perhaps Auckland/Sydney in three days!

His current objective is to get *Sundreamer* sailing reasonably well and then head up to the Bay of Islands. *Sundreamer* will be moored off Alan Warwick's Kerikeri property where David will take a busman's break from boats and concentrate on preparing a series of paintings for a June exhibition.

Sundreamer C3

LOA: 17.4m (57ft)
LWL: 16.9m (55ft 6in)
Beam (overall): 8.5m (28ft)
(between centrelines): 6.4m (21ft)
Width of hulls: .91m (3ft)
Draught: .38m (15in)
(centreboards down): 1.7m (5ft 6in)
Displacement: 4850kg (10,700lb)
Sail area: 100sq m (1070sq ft)

SUNDREAMER MISCELLANY

- David's total involvement to realise the full potential of his design concept he describes as "one unified force, starting with the drawings, then physically building and sailing the boat with knowledge and understanding of the end result."

- Sundreamer's* eight winches cost as much as *Sundancer* did to build.

- At station 4 of a 17.4m (57ft) boat is usually where you see the second loo and shower.

- Displacement is the same as for a 9.7m (32ft) keeler.

- David is not a fan of the French approach to multihulls. "They are made from so many different pieces it would not be reassuring in a mid-Atlantic gale wondering about who had bolted what to what and how well."