Laser® 28

The way it happened

In 1978 Performance Sailcraft, builders of the Laser, started to consider the development of a performance cruiser for the thousands and thousands of Laser owners who would not sail Lasers forever. As a first step, a design competition was held and four international caliber yacht designers asked for study concepts based on the following broad guidelines:

1. The boat should be absolutely One-Design in the Laser concept, that is, every boat would be identical and class rules would deter any changes or alterations to the boat, her equipment or sails. This would ensure that an owner of modest means would have equal chances of success to those of a more wealthy owner. In addition, the cost of maintaining a competitive boat would be kept within reach of all.

2. The boat should have outstanding performance characteristics. This would be essential to assure a long product life within the confines of a strict One Design discipline, where modification or improvement once in production would be unacceptable unless of a very minor nature. The design would not, therefore, attempt to follow the I.O.R. or any other level rating rule, thus giving the designer a free hand to design a fast, stable and responsive yacht that would not become out-dated by the artificial influences of the rule makers.

3. The design should be for a quality product incorporating the best of modern design and technology without recourse to over complication.

4. The selling price of the yacht in a ready-to- race state must represent a "best buy" in the market place, in that the specification and equipment must be of unrivalled value by comparison to others, the intention being to produce a 28 foot yacht with a performance of a 35 foot yacht at the price of a 25 foot yacht. New Zealander Bruce Farr was chosen as the project designer, not only for his outstanding design ability but also for the considerable engineering and production experience he brought to the project. Over 500 of his trailer yachts have been produced in Australia and over 100 of his 38' fast cruisers have been built worldwide.

At the start of 1980 the project took a new tack. Ian Bruce, then President of Performance Sailcraft, took the project out of Performance Sailcraft and an independent entity was set up free of any commercial pressures to undertake the first step of the development. A partnership was formed between Ian Bruce's development company Bruce Yacht R&D Inc. (BYRD), Bruce Farr and a U.K. group headed by Tim Coventry, then President of the International Laser Class.

Those involved in the partnership were as follows:

Ian Bruce	Industrial designer — President and founder of Performance Sailcraft.
Bruce Farr	Yacht designer — chosen as the project designer.
Tim Coventry	President of International Laser Class Owners' Association. Involved in Laser from outset. Project co-ordinator.
Norman Frost	Plastics engineer — specialist in GRP structures and production systems.
Peter Hicks	Experienced off-shore yachtsman.
Piers Phipps	Financial advisor to project.

This team possessed a wide range of skills and talents: industrial design, yacht design, engineering, production systems, project management, marketing and finance. Bruce, Coventry, Farr and Hicks are all experienced and successful yachtsmen, holding between them many world and international titles in the sport of yacht racing.

One of the two prototypes built in 1981 is shown here being put through its paces inside Falmouth Harbour, England. On this occasion a new Fogh spinnaker is being tested for the first time.

Stage 1

Performance Testing

The partnership decided to proceed with the construction of two prototypes so that they would have identical platforms on which to test different rigs, sail plans and equipment and the project was under way.

The first prototype was sailing in Falmouth, England, by early Summer, 1981, with a genoa rig and sails designed by Hans Fogh — it immediately established itself as a real performer by matching the half-tonners in the I.O.R. fleet. The second boat was sailing by late Fall with a slightly taller rig but with only a 108% "maxi" jib instead of the genoa, the goal being to provide the same level of performance with a headsail that would make the boat extremely easy to handle by a family crew or when shorthanded. The maxi is a very powerful headsail with approximately 16 sq. ft. of roach supported by a full-length batten allowing the leech to come all the way back to the sweptback spreaders. The rig was a delight to handle and proved equal or faster in all winds above 5 knots. In under 5 knots, the very small performance advantage of the genoa rig in no way compensated for the enormous cost and handling advantages of the maxi rig. Although the maxi would be changed to a working jib between 18 and 22 knots apparent (depending on wave conditions) when racing, this sail was safely carried in 35 kts apparent to demonstrate its versatility as an all-weather cruising sail. (See Photo)

Both rigs displayed performances that exceeded the original expectations. They were easy to handle, particularly the maxi, rewarding to an expert sailor, forgiving to a novice, dry in a seaway and, above all, safe in adverse conditions. One boat was repeatedly broached in 35-40 knot winds with the large spinnaker to test the gear and the flotation with the boat on its side. The cockpit always came up bone dry and there were no gear failures. (In fact, there have been no structural or equipment failures in three years of hard sailing.)

Double reefed with "maxi" jib in 35 knots apparent off entrance to Falmouth Harbour, England, Fall 1981

Achieving a "Best Buy"

Yacht manufacture has tended to be a traditionally based activity, with relatively slow progress in the application of efficient production processes. The level of capital investment has been low and selling prices high. As a direct result, production methods remain labour intensive and inefficient by comparison with other industries processing similar raw materials.

The most widely used material of construction today is fiberglass reinforced polyester resin but it is not without its problems. It is messy, produces an unpleasant working atmosphere because of the emission of styrene (that fiberglass smell!), is labour intensive and, because of this, quality sensitive.

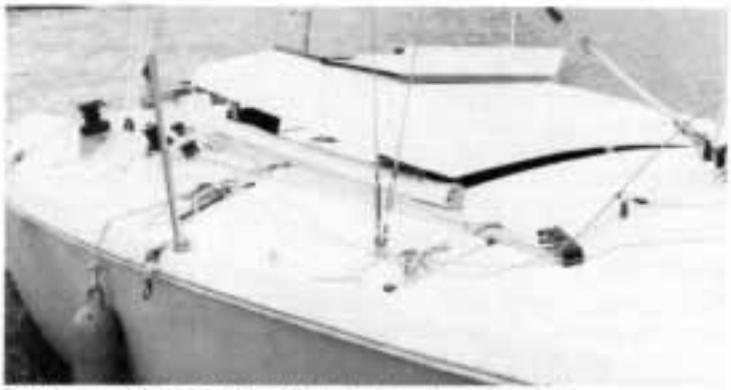
In order for this boat to be a best buy, a different approach was needed to both meet the rigid criteria of the One-Design concept and to achieve the significant savings in costs necessary to ensure a breakthrough in pricing.

Full scale interior mock-ups were used to test over 12 different interior arrangements.

The approach decided upon was to employ a method of manufacture known as the "Closed Mould Process". In this process inside and outside mating moulds are used between which the reinforcement is loaded and then resin introduced. Pressure is applied and, after a relatively short curing time, a completed component is released from the moulds which is finished on both sides. While the broad principles of such a system are well known in the fiberglass industry, no one to our knowledge has successfully developed a viable system for true mass production in the boating industry. Great skill (and even more capital investment) is needed in the design and development of the mould systems and a detailed knowledge of the resin chemistry is essential. The component to be made must be designed with knowledge of the process and much of this can only be achieved from experience.

Experience was what the team had. Norman Frost had been primarily responsible for the development of an extremely successful vacuum assisted closed mould process which Ian Bruce currently uses to produce the fiberglass components for the seats which his company, BYRD, supplies for all of Canada's new passenger trains. The process produces identical industrial components to a high standard of predictable quality, shows a dramatic cost reduction in the labour element, produces a better utilization of space and, as a bonus, is environmentally "clean".

The prototypes were therefore designed to meet all the requirements of a closed mould system and were built to simulate as nearly as possible the structure that could be produced in this moulding system because therein lay one of the keys to the "best buy"; minimum labour to mould and no labour to finish as the inside of all parts would already be finished. The other lay in the structure



Prototype with large section of flush deck starting to be raised

Top fully "popped"

designed by Russ Bowler of the Farr office (which, incidentally, has now moved to Annapolis). A floor and frame structure was designed to be dropped into the hull before demoulding so that no other structure would be required. This meant that no structural bulkheads would have to be glassed into place after moulding and all components would be assembled with wrenches and screw drivers in a true assembly line again producing significant savings.

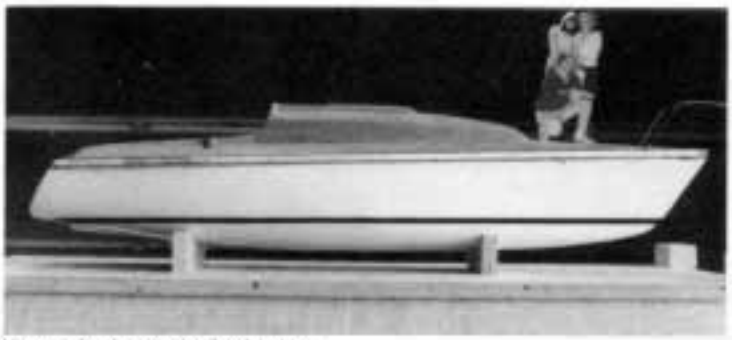
By the end of 1981, therefore, the partners had achieved the performance and handling characteristics they sought, had proved the structure of the boat and its equipment (in fact one prototype was purposely built 10% under specification to try and highlight possible areas of failure) and now faced the formidable task of moving the project from there to the market.

Stage 2

Formation of Precis Ninety Nine Limited

Although the project was already at a stage of development far beyond that which any builder would consider undertaking prior to building and marketing a new boat, the team knew that the work was really just beginning and the following areas still remained to be addressed:

1. The design should be fully reviewed by Farr to assure that it was state-of-the-art.
2. A closed mould system had to be developed to the stage where it could produce commercially acceptable mouldings and master moulds produced.
3. Production tooling then had to be made from the masters.
4. The interior accommodation for the yacht must be designed and developed for customer convenience and commercial manufacture.
5. Mast, rigging, fittings, control systems and deck layout should continue to be tested, reviewed and refined before being "frozen" into the Laser concept.
6. Sails, particularly, should continue to be tested in conjunction with Hans Fogh, over a much longer period to evaluate the longevity of the selected cloth and to search for the optimum shapes. At the last moment, they would be frozen, digitized and computer cut and assembled by one source for the class to assure identical sails in exactly the same way 150,000 Laser sails have been made. (Fogh designed that one too!)



Very early clay study of cabin top.

The prototype gets its trial cabin top at BYRD, Summer 1982.
(In the background are railway seats using the closed mould process.)

The team were well equipped to do the work but one key ingredient was missing — money. They had accomplished the initial development within their limited budget but were not prepared to sell the project without the technology to produce the boat being fully proven as this would result in just another 28 footer (albeit a superb one!) in the market at a price plus or minus a few hundred dollars of any other boat of comparable size. A major investment was needed and Piers Phipps, the financial partner arranged for an equity investment in a new company — Precis Ninety Nine Limited — which was incorporated to carry forward the development of the boat and the closed mould tooling.

With an investment of over $1,000,000 now planned, it was time to take a hard look at the boat and come to some decisions that would have a long lasting effect on the project.

Honest Accommodations

The original prototypes were built with a flush deck arrangement whereby a 6 ft. long x 4 ft. wide section of the deck reaching from the companionway hatch to the chainplates could be "popped" to provide 6' head clearance. While it provided a superb platform under sail, concern had been raised in the U.K. over the safety aspects of such an arrangement (the Fastnet tragedy was still fresh in people's minds) and the team themselves felt that it compromised the accommodations. As the performance was already well established, it was decided to proceed with a fixed cabin top even though it would give the boat more of a cruising look. This would be in line with the decision to now put an absolute priority on developing an "honest" interior which would contrast sharply with the current practice among builders of performance boats offering "cruising" accommodation that is little more than full kneeling headroom!

In line with this decision, one prototype was shipped to Montreal in the Spring of 1982 and the flush deck replaced by BYRD with a prototype cabin top for trials during the remainder of the Summer to determine the structural requirements of the new configuration and the re-organization of the deck hardware.

Sails & Rig

The maxi rig was chosen as the standard for the boat to be used in all class racing. Provision for, and testing of, a genoa was included in the sail testing program to be made available as an option for anyone racing out of class in PHRF or MORC fleets. Hans Fogh continued to work all Summer on the prototype with Ian Bruce in Montreal and in the Winter of '82-'83, worked with the Farr office when the boat moved to Annapolis for winter sailing.

Choice of Engine

The prototypes were fitted with a Honda 4 stroke gasoline engine fitted to a Volvo sail drive. They were quiet, smooth, extremely convenient to use, started with a pull chord and, above all, light. This didn't change the fact that they were gasoline engines and, particularly in Europe, there was resistance to the point of rejection. So a decision was made to locate a suitable small diesel and accept the weight penalty.

Hull Design

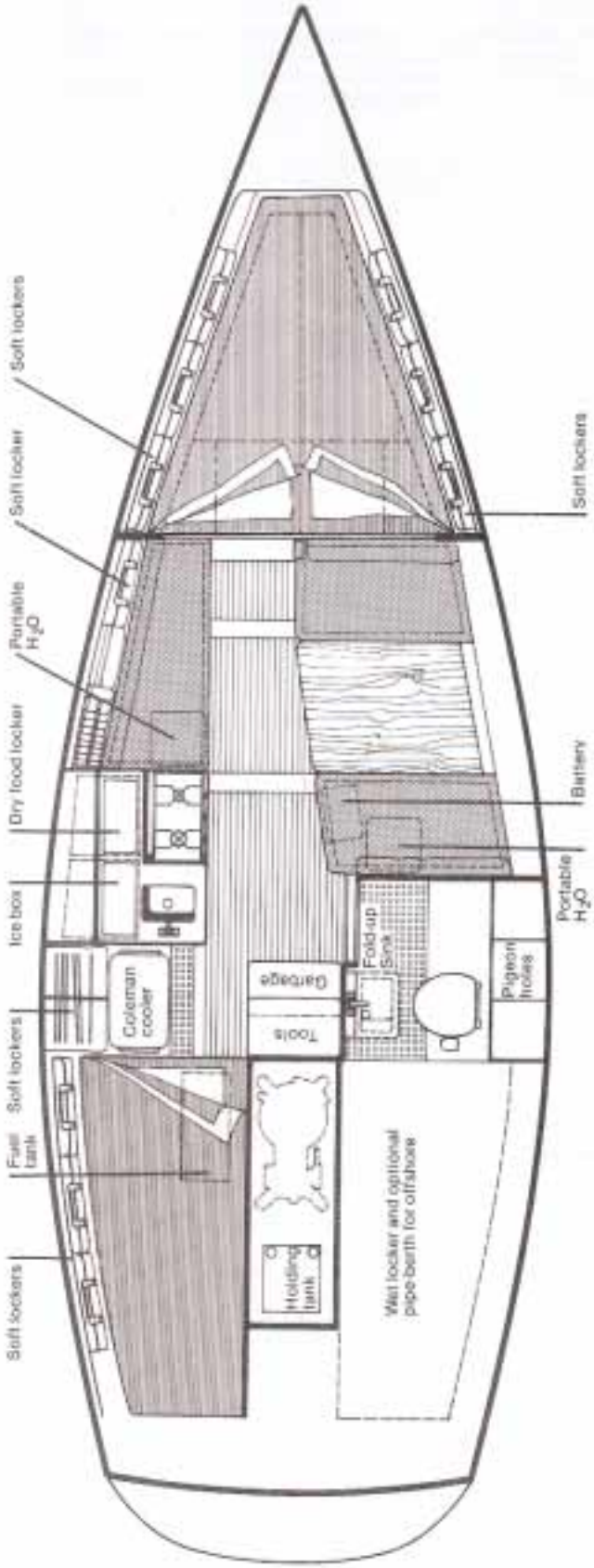
A great deal was learned from sailing the prototypes and, notwithstanding their performance, Bruce Farr felt that some significant improvements could still be made to the performance and handling characteristics of the boat. He would use computer modeling techniques to quantify those changes and to optimize the keel configuration and, at the same time, he would make allowances for the change in weight distribution due to the diesel engine. (It is of interest to note that, during this same period, he was also designing the 37 ft. IOR boat, Migizi, which won an unprecedented 5 out of 6 races in Class F at SORC and also designing the highly successful Dickerson 37 which, in its first season, completely dominated the IOR racing on Chesepeake Bay).

Conclusion

The Summer of 1982 was spent testing the boat with the cabin configuration and racing the boat in an established PHRF fleet where it was given, and sailed to, a PHRF handicap of 2.0 (120 if you are used to ratings in seconds). While sailing trials continued, a full sized mockup of the interior was built at Bruce Yacht and over a dozen interior layouts tried full size. When the final arrangement was chosen, a deck configuration was decided upon and tooling started for the final production deck.

1983 saw all this come together into the present product — a boat with proven performance unmatched for its size, yet a boat that is an honest cruising boat in every sense of the word and probably easier to handle than any other cruising boat of equal length.

The project culminated in October 1983 at the Annapolis Boat Show when the public and the press gave the boat a reception that overwhelmed even the design team! One reporter wrote — "What has evolved is so impressive and practical that one is tempted to pinpoint criticisms so the boat won't seem so perfect. It would be hard to find a boat which offers more performance and internal volume in this size range for the money."



Photos may show optional equipment

1

3

2

4

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6

Standard Features and Equipment

Construction

1. Hull & deck Kevlar sandwich construction using Termanto cross-linked PVC foam
2. Keel loads transferred into floor structure and not hull skins
3. Structural calculations based on grounding safely at 8 knots.

Sails

1. Mainsail w/2 reefs, full length upper batten, 3rd reef optional
2. 108% Class Standard "maxi" w/2 full length battens, luff tape for head foil.
3. Working jib
4. Large all round reacher/runner spinnaker

Spars and Rigging

1. White baked paint finish.
2. Main halyard, 2 genoa halyards, spinnaker halyard, 1st reef and 2nd reef outhauls, Cunningham, Vang, Outhaul, Spinnaker downhaul and topping lift.
3. Spinnaker pole
4. 1 x 19 s/s rigging throughout, Navtec chainplates
5. Mast deck-stepped on custom tabernacle for self lowering. Fig. 4
6. Mast and boom extrusions custom designed by Farr.

Deck Hardware

1. Finest quality Schaeffer and Harken throughout
2. Maxwell 22 S/T, two speed, primary winches
   Maxwell 14, single speed, halyard winches
3. All halyards and winch-operated control lines stoppered.
4. 4:1 speed trimming on main sheet, 8:1 fine control for helmsman

Cockpit

1. One large cockpit bin under hinged seat top on starboard side (optional port side).
2. Engine panel sheltered in starboard locker
3. Tiller swivels vertically to clear cockpit area completely.

Safety

1. Pulpit, sternposts and staunchions fitted with double life lines
2. 1½" drains (2) in cockpit with separate exits.
3. No water access through cockpit lockers to interior.
4. Danforth 13S anchor mounted in custom designed well.
5. Molded-in non-skid for maximum traction.

Engine

1. Bukh DV 8SME, 8.2 H.P. Diesel with sail drive.
2. Water sensing switch fitted between double membranes for 100% security.
3. No internal corrosion of sail drive leg as cooling water is obtained through separate inlet with seacock.
4. Flexible supports with hydraulic damping.
5. 2 Blade, Gori, folding prop.
6. Electric start, 18 amp. alternator.
7. Decompression lever and facility for pull start

Plumbing

1. Portable polyethelyne fresh water tanks attached to hand pumps in head and galley. Capacity limited only to number of tanks carried.

Electrical

1. Navigation bowlight, stern light, steaming light, and anchor light.
2. 4 reading lamps in V berth and main cabin. Dome light in quarter berth. Fluorescent light over galley and in head.
3. Single battery connected through switch with provision for second battery.
4. All switches on safety breakers.

Accommodation

1. Double V berth; dinette converts to double; large quarter berth sufficient for 2 children or 1 adult.
2. Incredible amount of storage space in individual "Soft Lockers" throughout boat. Removable in Spring and Fall. 3 Soft Lockers per side plus night storage pouches for glasses, pocket books, medications etc. Fig. 3.
3. Standing head room — 5'10½"

Galley

1. 2 Burner propane gimballed stove W/piezo electric lighting — (no matches!)
2. Chopping board tops on 1½" insulated ice box and dry locker. Fig. 5.
3. Removable chopping board stored under stove fills out counter top. Fig. 5.
4. Large under-counter storage.
5. Dish and cup storage behind sliding doors.

Head

1. Fully enclosed with marine toilet and through-hull
2. Access to large wet locker aft is through head.
3. Shower can be added as option.
4. 6 large pigeon holes provide private storage for all crew members.
5. Safety and First Aid locker behind sliding doors.
6. Folding basin provides seated access for shaving, make-up, etc.

Navigation

1. Extra large dinette table provides chart table capability with storage box under. Figs. 1 & 2.
2. Instruments stored in "soft locker" liner.
3. Chart/reading light provided.

Conveniences

1. Tool locker under top step. Garbage under bottom step
2. Removable laundry bin (forepeak) and garment bag (aft of galley).
3. Separate cooler supplied for home packing
4. Companionway hatch slides back 4" beyond washboards for rain proof overhang.
5. Panels from V berth convert main cabin into round-the-table lounge, when removed provide access to spinnaker storage and forward hatch. Fig. 6
6. All locker lids integral with cushions, including berths.
7. All seacocks handy to main cabin.
8. Cabin sole completely removable.
9. V berth removable for racing.
10. Custom designed, low-profile hatch provides minimum interference to foredeck work.
11. Guaranteed finger jam proof companionway hatch!
12. Engine access from companionway, quarter berth and wet locker.
13. Top step in companionway same level as cockpit floor for easy access to halyard winches and stoppers.
14. Tinted windows to cut down heat buildup.
15. Drain hose on ice box connects to sink drain throughull.
16. Immediate battery access under settee cushion.
17. Hull under lockers, berths, floor boards and cabin sole accessible for cleaning and inspection.

Principal Dimensions		
LOA	8.66 m	28.41'
LWL	7.2 m	23.62'
Beam	2.89 m	9.48'
Draft	1.518 m	4.98'
Displacement	1795 kg	3950 lbs
Keel weight	682 kg	1500 lbs
Sail areas:		
Main	22.47 m²	242 sq. ft.
Lapper (106%)	16.16 m²	174 sq. ft.
Working jib	11.43 m²	123 sq. ft.
#1 Spinnaker	62.24 m²	670 sq. ft.
Opt. #2 Spinnaker	56.67 m²	610 sq. ft.
Opt. Genoa (153%)	21.36 m²	230 sq. ft.
Opt. Storm jib	4.37 m²	47 sq. ft.
Mast height from waterline	12.64 m	41.47'
Foretriangle height, I	9.48 m	31.10'
Spinnaker hoist, I	9.67 m	31.73'
Foretriangle base, J	2.94 m	9.65'
Mainsail luff, P	10.10 m	33.14'
Mainsail foot, E	3.95 m	12.96'
Pole length	3.45 m	11.32'

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