SUMMIT 40

Summit 40 Project Outline
2010

March 19, 2010

SUMMIT YACHTS

GOAL:
The goal is to design and build a competitive race boat that can win at any level of IRC competition against boats in the 35 – 43 foot range. By virtue of its all around performance characteristics, it will also be competitive under other current rating rules such as ORC. Due to the subjective nature of PHRF ratings, it is not possible to predict what the boat might rate in various PHRF fleets around the country.

DESIGN:
The design is based on Mark Mills design for Summit Yachts and originally built by King Marine. It is arguably the most successful IRC 40 internationally in the last two years. In the USA, Soozal and Act One (now White Heat) have had the most consistent winning record of any similar size IRC design. When production of the boat was moved to Edgewater Boats, the first question posed to the designer was, “Should we start with a clean sheet of paper, and design an entirely new boat?” Mills response was that if the boat was to be targeted at winning under the IRC rule, and if the length was to remain 40 feet, then the base existing design would be very hard to improve upon. This is due in part to the stability of the IRC rule over the last few years and the degree of success that this particular design had achieved.

While the basic design parameters might still be optimum, there is always room for incremental improvement in design details, construction, and fit out. Starting with a strong platform, these incremental improvements, based on experience of hundreds of winning races, will lead to even better performance. The possibility of making a design error and taking a step backward is eliminated. The success of the project from the design side is virtually assured. Different sailing conditions and events allow for subtle tuning changes to optimize the boat for the expected competition. The same answer is not always the best for everyone. Mills Design & Summit work with individual clients to assist them in having the best balance between rating, performance, and racing venue.

Every aspect of the design was analyzed and discussed among Mills, Summit, EWB, and Southern Spars. Displacement, draft, sail area, construction method, and equipment were all analyzed and there are improvements in every area. On the design side specifically, Mills Design has made subtle changes to the keel fin, bulb, and rudder. The keel will be a bit more forgiving coming out of down speed tacks and will improve acceleration, especially in light air and chop. The bulb has been slightly reduced in wetted surface area, and now allows a slight alteration in weight and draft for more aggressive programs (more later). The rudder area and planform remain virtually the same, but the redistribution of volume along the chord will keep flow attached longer and improve heavy air control.

The new keel fin has a provision to add 65mm (2-1/2”) of extra draft and another 255 pounds (115.6 kg) of ballast. Moving the bulb down and increasing its weight will increase righting moment. The weight savings in rig, gear and equipment will still mean an all up lighter boat with more ballast and a lower VCG, higher RM: all going in the right direction. The plugs for the keel fin, keel bulb, and rudder will be completely new. They are currently being computer milled at Marine Concepts and new extremely accurate and fair molds will be produced. The standard keel and rudder will be faired to N/C templates and finished in epoxy to a 220 grit finish ready for anti fouling paint, or they may be finished in epoxy to a 600 grit finish.

The transom has been given a more aggressive treatment and is open and lighter. New deck tooling is being produced to build this rather complex shape. The deck layout and cockpit proved to be easy to work and efficient. There are some subtle gear changes, but we did not try to disturb a good thing. Redesigned steering pedestals and carbon wheels will save 8 pounds (3.6 kg). We highly recommend the electric/hydraulic push button backstay system. The motor has a 16 pound (7.3 kg) weight increase, and .001 rating increase under IRC. However the speed and finger tip control of the rig is more than worth the weight & rating change. It only takes one use to be convinced.

One area where improvements always yield better performance is the rig. We have madesignificant changes here. First, there are no longer any standard aluminum components in the rig. The entire structure is carbon. Along with this, the mast will be built by Southern Spars and will have better structural properties, and detailing. Specifically, the standard Southern rig will be 55 pounds (24.9 kg) lighter than the previous rig. An internal hydraulic mast jack is now standard. The standing rigging is stainless rod from Rig Pro, and it has significant upgrades in fittings and details. All together the new Southern Spars rig will be a significant improvement over the previous rig in stiffness, windage, and weight.

Southern Spars has also engineered a mast in high modulus carbon which is the ultimate in stiffness and weight reduction. This mast is available at extra cost. There is also a high modulus carbon boom available at extra cost. The benefits of the boom will not be as significant as the mast, but it is available. The high modulus rig is in design now. The weight saving will be about 8 kg, but the advantage will be in increased stiffness.

The interior will be fit out to maintain the reasonable IRC hull factor of its predecessor. Mills & Summit have examined where weight and CG can be optimized without adversely affecting the hull factor. Despite some arguments to the contrary, HF has a subjective component, so the interior style of the Summit 40 will not be far off the previous boat. However there will be several subtle improvements. The major interior components will switch from plywood to composite. Renderings of the slick galley & nav station are attached.

- In the V-berth, the hanging locker & bureau will be replaced by a slightly largerhanging locker which will be practical for crew gear between races and lighter by 6 pounds (2.7 kg).

- The bunk bottoms and Pullman berths in the main saloon will be composite instead of plywood and save 20 pounds (9.1 kg).

- The cabin sole will be carbon/e-glass composite instead of plywood which will save 36pounds (16.3 kg). There is a photo of the sample attached

- The composite galley will feature a large single sink instead of a double sink. That will.allow the galley island to be moved outboard to open the area for sail handling and.reduce weight.

- The propane stove, tank, regulator, solenoid, hose and tank well may be eliminated for.more aggressive teams. In its place will be a two burner alcohol stove. The weight.saving will be 81 pounds (36.7 kg)

- The three lead acid batteries will be replaced by two AGM glass mat batteries with a compact Optima 34 starting battery. The total savings will be 40 pounds (18.2 kg).

- The dual alternators and extra steel mounting bracket will be replaced by a Balmar high output alternator. The weight savings will be 22 pounds (9.9 kg).

- The hot water tank & plumbing will be eliminated: total savings 35 pounds (15.9 kg) (over empty tank). Hot water is available on request.

- As an option, the GRP headliner may be eliminated. The overhead in the cabin will be faired and painted white. The weight savings in the deck will be 220 pounds (100 kg).

Final IRC ratings vary depending on the venue and the individual sailing style. Most of the rating delta is due to the choice of retractable sprit over conventional pole, and the size of the sail plan. Based on experience on the race course and close observation, we are confident that the conventional pole holds the advantage in all but the lightest windward leeward courses. That assumes competent foredeck crew. If a majority of races were to be in very light air or offshore where there could be a lot of reaching, the retractable sprit might be recommended, but for most serious race programs, the spinnaker pole is the answer.

Sail area varies with region. The I,J,P,E remain constant, or nearly so, but the main & jibgirths, headsail luff length and spinnaker area may vary Rating variations of up to 15 points have proven successful in the right conditions. In general, UK sailors favor a heavier air set up with smaller girths, less sail area and lower ratings. In North America where lighter air is the norm (apologies San Francisco), sail area means speed. We have had great success with larger main & jib girths and max spinnaker area. The boat has been easily capable of carrying the additional rating points. That said, Mills design welcomes the chance to work with individual teams and their sailmakers to create the best combination for the anticipated conditions.

The *lightest* recommended IRC measurement weight for this design is 15,324 pounds (6,950 kg). The previous boats had an average base line weight of 7,050 kg. The proposed boat would be approximately 15,300 pounds (6,940 kg): right at the low end of the desired design weight with significantly lower VCG and higher R/M. That will be a performance plus.

That is our current plan for a fully IRC optimized Summit 40. We understand that different teams sailing in different areas might want to have input into this plan and share their performance ideas. Summit Yachts and Mills Design look forward to discussing the Summit 40 with interested clients.

40 PRODUCTION SPECIFICATIONS
2010

PRINCIPLE DIMENSIONS – PRODUCTION

LENGTH OVERALL 1	2.11 M	39.72 FT
WATERLINE LENGTH	10.60 M	34.76 FT
BEAM	3.70 M	12.13 FT
DRAFT	2.59 M	8.50 FT
DISPLACEMENT	6,950 KG	15,325 LB
WET SURFACE AREA	2 9.1 SM	310 SF
RIGHTING MOMENT	190 KG/M	1,374 FT/LBS
FORETRIANGLE	16.0 M	52.48 FT
FORETRAINGLE BASE	4.7 M	15.41 FT
MAINSAIL HOIST	16.0 M	52.48 FT
MAINSAIL FOOT	5.5 M	18.04 FT

SPECIFICATIONS MAY VARY WITH CLIENT OPTIONS

ESTIMATED IRC RATING: 1.127 (APPROXIMATE)
IRC CREW NUMBER: 10

SUMMIT 40 STANDARD SPECIFICATIONS
SUBJECT TO CUSTOMER ORDER
OPTION SELECTION MAY CHANGE STANDARD GEAR

Hull & Deck

- Vinylester vacuum infused composite sandwich hull and deck construction.
- Foam core laminate with biaxial and uni-directional E-glass fabrics with high density core blocSUMMIT of glass-filled urethane.
- Full compliance with European RCD (CE), including ISO 12217-2 Category A certification.
- 750kg SG Iron (80-55-06) keel fin with 2300kg antimony/lead bulb (approximate).
- Gelcoat hull and deck finish.
- Bonded hull to deck joint with molded toe rail to ORC requirements.
- Structural bulkheads bonded to hull and deck.
- Composite structural IGU forms base for interior structure, engine bed, etc.
- Fabricated Anodized Aluminium Keel structural frame and mast step.
- Recessed hatch garage. Life raft locker in cockpit
- Molded propane locker, vented into cockpit.

Electrical

- Lifeline AGM 31 Batteries – 2 each.
- Digital Battery condition meter.
- Custom DC electrical panels w/ 16 circuit breakers.
- Navigation & steaming lights
- Interior lighting all LED

Propulsion & Steering

- Yanmar 3JH4E x SD50 39 hp 3 cylinder, diesel engine with sail drive, fresh water cooling, fuel filter & 80 amp alternator.
- Molded composite engine surround with 25mm engine insulation.
- Yanmar Type C recessed engine instrument panel on companionway ladder.
- Morse-type manual gearshift and throttle.
- 127 litre fuel tank (31 gallon) with inspection with remote gauge.
- 420 x 340 (approximate) folding prop.
- Balanced spade rudder with custom carbon fiber stock and roller bearings.
- Twin alloy race wheels, 950 mm diameter mounted on custom composite pedestals.

Plumbing

- Icebox drain with sink mounted pump for draining.
- 200 litre total water capacity in two separately valved tanks.
- Marine head: 20 litre holding tank with Y-valve and overboard discharge.
- Hot & cold pressure water system.
- Water heater 20 litre tank heated from engine and/or (optional 110vac)
- Head shower with Y-valve for bilge / shower pump.
- 2 Manual bilge pumps: 1 in cockpit and 1 below decks.

Deck Hardware

- Two Harken* 53.2 ST 2 speed primary winches
- Two Harken* 44.2 ST 2 speed mainsheet winches.
- Two Harken* 44.2 STQ Quattro 2 speed secondary winches 1- double lock-in 10” winch handle / 3 single lock-in 10” handles.
- Harken deck hardware as shown on deck plan.
- Underdeck mainsheet lead aft p&s. Jib lead adjusters lead under the deck to jib trimmer Traveller lead forward under deck to main trimmer
- Spinlock Rope Clutches and stoppers.
- Custom stainless steel double rail open bow pulpit and stern rail.
- Custom stainless steel tapered lifeline stanchions, aft 2 pairs with support legs.
- Three flush mount mooring cleats.
- Round foredeck hatch, Lewmar size 22 or equal.
- Two Lewmar Size 20 articulated tinted acrylic

Galley

- Polished stainless sink recessed in counter top with fiddles.
- Two burner gimballed propane stove with oven.
- Propane gas bottle in cockpit locker connected through solenoid shutoff switch.
- Pressure water pump.
- Swivel faucet pressure water.
- Large hinged top opening icebox.
- Dry goods storage bins.
- Storage locker under stove.
- Two drawers, pot storage and locker.
- Rubbish bin.

Spars & Rigging

- Carbon Mast by Southern Spars – 2 pairs swept carbon spreaders / no runners
- Carbon boom with end fittings, 12:1 internal outhaul, and mainsail reef clutches and sheaves, mainsheet bail and mechanical Vang lug.
- Discontinuous s/s rod rigging Harken Carbo foil on headstay
- Double masthead spinnaker halyard sheave.
- Double genoa halyard exit sheaves at hounds.
- Two 10mm vectran 100 genoa halyards Tylaska T-8 Shackles
- Two 10mm vectran spinnaker halyards Tylaska T-8 Shackles.
- Main halyard, 8mm vectran 100, 2:1 with Tylaska H-8 shackle.
- Mainsheet – 10 mm spectra.
- Traveller control lines Dacron braid.
- Custom carbon-fiber spinnaker pole & gear by Southern Spars
- Two 8mm DSK 75 spinnaker sheets / two Spec Set II after guys Tylaska T-8 shackles
- Two Endurabraid genoa sheets with Equiplite connectors.
- Sailtec -17 backstay adjuster with single function panel
- Solid Mechanical Vang from Southern Spars.
- Custom SS chainplates
- Two jib inhauls
- Two mainsail clew reef lines.

Interior

- Doorway forward into the forward stateroom, with an enclosed head to starboard, and a large bureau and hanging locker to port. The large double V-berth has sail storage underneath forward and duffel storage aft. Large fore hatch.
- Enclosed head with mirrors, storage outboard, dual purpose shower/sink spigot, and door. Head Compartment is a composite molding with integral shower sump for easy cleaning and draining, with overhead hatch.
- Finish is off-white with wood trim on vertical surfaces and bulkheads; lightweight bunk tops with white finish; wood drawer and cabinet trim. Galley & Nav station countertops are clear coat carbon fiber
- Vinyl covered hull sides in forward and aft cabins.
- Molded composite overhead in main cabin.
- Choice of designer cushion fabrics
- Main cabin settee berths with split backrest cushions port and starboard. Seatback hinges up to form pilot berth.
- Lightweight drop-leaf table with wood trim fitting over anodized aluminum support rail for easy removal.
- Large, sit-down, forward facing 1.0 x .6m (39” x 24”) nav. table with chart storage, overhead instrument panel and outboard bookshelf.
- Double quarter berth to port, single quarter berth to starboard.