

# NEMA

NEW ENGLAND MULTIHULL ASSOCIATION



The summer racing season culminated with the Newport Unlimited Regatta, run for the first time by NEMA.

Twenty-one NEMA boats, 9 A-Class Cats, 13 International Canoes and 5 Raves competed in separate events.

Left: A-class Cats take off

**Next NEMA Meeting**  
7 p.m. Thurs., November 2  
Savin Hill Yacht Club, Boston  
Guest Speaker: Gerard Sperry  
Builder of Conser 30  
(see page 2 for more info)



Tri-Me sails past The Big Red Boat in Newport Harbor.

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The New England Multihull Association is a non-profit organization for the promotion of the art, science, and enjoyment of multihull yacht design and construction, racing, cruising, and socializing. The NEMA Newsletter is published at no additional charge for NEMA members. We apologize in advance for any inadvertent errors.

Submit articles or letters to the newsletter editor, by fax (978-231-6108) e-mail (judy@inzones.com), or mail (5 Haskell Court, Gloucester, MA 01930).

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## Next NEMA meeting, Thursday, November 2

Gerard Sperry of Sperry Boats will talk about the construction of the Conser 30, designed by Jon Conser.

According to the Sperry web site, the Conser 30 sails "at the speed of the wind and more". Sperry Boats uses superior materials, construction techniques and hydrostatic testing to insure a fast hull in all wind conditions.



John Conser's inherent sense of design was fine tuned by naval architect, Jeremy Laundergan, of Askeland Engineering. Jeremy has worked on such projects as Stars

& Stripes, Sony Playstation and the Hobie Wave. As a result, the Conser 30 is close-winded and powerful, yet easy to single-hand. The boat is easily steered from either hull on either tack. The self-tacking jib makes changing direction as simple as pushing the tiller and the fine hulls with deep centerboards power through tacks with authority. Kick-up rudders make navigating skinny waters a breeze, and beaching is a matter of stepping off in inches of water.

The meeting starts at 7 p.m. with a pizza social. Prior to Sperry's talk we will show Bill Fitzgerald's Newport Unlimited video.

### Nominations for NEMA Board

Nominations are currently being accepted for the 2001-2002 NEMA Board of Directors. Elections will take place at the December meeting. Board positions include Commodore, Vice Commodore, Race Committee Chairman, Cruising Chair, Treasurer, Secretary, and Newsletter Editor. (Current board members are eligible for nomination.)

To nominate a NEMA member to one of these positions, please send email to nemaboard@nemasail.org.

## Gulf of Maine Update

The Portland Yacht Club has been hosting the Monhegan Race, Maine's premier offshore racing event, for 60 years. In recent years a small multihull fleet has participated, on several occasions only two boats. This year there were five. For the first time in the history of the race a multihull, Tom Egan's 37 foot trimaran, Scout, with Egan, builder Walter Greene and offshore veteran Phil Steggall aboard, was first to finish. The 100 mile race included a 40 mile upwind leg; nevertheless the Greene Marine 37 finished 55 minutes ahead of the next boat, Dick Hale's 47 foot Nelson Marek sloop, Bandito. Egan was awarded the Maine Fisherman trophy, for first boat to finish.

Scout won the multihull class. Peter Garcia's Newick 36 Alegra was second, and Lynn Hall's F-31R Arriba third.

Richard Saltonstall, whose 45 foot tri is nearing completion in Dick Vermeulen's yard, sailed with Lynn Hall, and presented a new perpetual trophy to Portland Yacht Club at the well attended awards ceremony. The trophy, a large hardwood plaque, is decorated with an engraved image of the catamaran Amaryllis, and is to be awarded to the first multihull in the Monhegan Race annually. Amaryllis, Saltonstall explained, was Nat Herreschoff's 19th century catamaran, with which Hereschoff beat all comers, and thus "annoyed the boys at the New York Yacht Club" so they prohibited multihulls from racing. Saltonstall finished by remarking, "That's why he's my hero," before presenting the trophy to Monhegan Chairperson Leigh Palmer, who accepted it for Portland Yacht Club.

—Peter Garcia

# North Carolina Cruise

May 13 - 31, 2000

By Tom and Evelyn LaMers

**From Chat de LaMer's daily log: Tom and Evelyn LaMers on a Sea Wind 24+2 and John Cleary and Tom (TO) Osborn on the F-27 Whisperings.**

*Tuesday May 16*

We departed Yellow Springs, Ohio Saturday the 13th at 2 PM to arrive at the Beaufort, North Carolina boat ramp about 10 PM Sunday. We parked next to John who is already asleep in his camper/tow vehicle.

Enroute we stopped in DC to see the Vietnam war memorial, White House, Capital and Mall. This was also the day of the Million Mothers March and a few blocks from the White House we bumped into Hillary Clinton out working the sideline crowds. We both shook her hand and promised her our mothers in

Rochester would vote for her. She kept smiling and shaking our hands but didn't seem to connect with the reference to Rochester. I guess she is still adjusting to being from New York.

Monday we launched very quickly and tied up at the beautiful Beaufort City Docks. During our launch the main sheet snap shackle unclipped from the boom and the mast came crashing down, not on a Mercedes, but onto the mast-carrying, trailer-support roller where it bounced. Not a bend or a dent! TO arrived in the afternoon having driven from Yellow Springs in under 11 hours. He was in good spirits and this would be his first cruise. We provisioned and put things in

ship shape. First sail of the season and lots of new gear on both boats.

*Wednesday May 17 to Sunday May 21*

Departed Beaufort for a 65 mile trip to Ocracoke via the old ICW with overnight stops at Cape Lookout and Atlantic. This is one of our favorite remote, shallow-water sails and a route accessible only to beachable multihulls! On the first leg, departing Moorehead City Channel, Whisperings accidentally fills the lee ama with about 1800 pounds of sea water when they hit the tidal rip with an ama hatch not dogged tight. No one notices until the sails are down and the boat is still heeling! We enjoy the beach, lighthouses, small fishing-village atmosphere and the hospitality. Saw a big loggerhead just inside Cape Lookout.

When we finally tied up to the Park Service Dock in Ocracoke the three men wanted beer, ice cream and dinner in that order. Evelyn was set for a civilized gin and tonic with smoked oysters on board! Everyone wanted fresh shrimp but, alas, the local markets were sold out! TO, who had a concert in Dayton, took the ferry back to

his car at Cedar Island for another mad dash round trip to Yellow Springs but would return in four days time.

*Monday May 22 to Thursday May 25*

Stormy weather so we lounged around Ocracoke for the day enjoying beach-town atmosphere. The sports fishermen catch some very big fish just off the inlet! Sea otters eat the scraps but were laying



Cape Hatteras Lighthouse, Buxton, NC

low while we were there.

In the AM neighbors of the previous evening returned from across the inlet having been struck by lightening. Their 22' cat boat was at anchor with them below when the bolt vaporized their masthead antenna, traveled across the boom melting damp spots in the furled sail and exited over the rudder. The husband could not move his legs for several minutes but they eventually got up and were able to motor back to town where they assayed the damage which included a leak thorough the hull. They decided to bring the trailer over on the ferry. Ungrounded mast!!

Tuesday we sailed to Buxton to see the famous Cape Hatteras lighthouse which had been moved 3000' from the waters edge the previous summer. The boatyard owner in the tiny Buxton basin was down surfing in El Salvador so the second in command said we could stay the two nights for free. We also got an up-close look at the maintenance side of sports fishing.

Thursday's return to Ocracoke started out hot with light air and ended with

*continued on page 4*

**North Carolina Cruise,**  
*continued from page 3*

both boats trapped in a late afternoon frontal storm with heavy lightening directly overhead and on all sides. We at first dodged the cells but eventually they were too numerous and large and we were in for the full treatment.

John, who was now single handing, was 1/2 mile ahead of us and just entering the marked channel intending to meet TO in Ocracoke. At the moment of the storm's full fury, and just as we lost sight of one another in the rain; TO, on the ferry, looked out the window to see "his boat" not 200 feet away trapped in the channel between two oncoming ferries and a thunder cell. When we finally got to the dock John took the night off to go dancing while TO, Evelyn and I had a big dinner and conked out. Friday was recovery day! Both boats had grounded rigs.

*Saturday May 26 To Tuesday May 28*  
The "shocked" captain of the cat boat had suggested we visit Historic Bath and Goose Creek State Park which are both idyllic anchorages far up the Pamlico River estuary. Both were very beautiful spots but we spent two evenings dealing with thunder storms. Our deck tent proved itself once again in the wind and we were off early for the 51 mile trip to the Cedar Island ferry dock where we would return TO to his car and take the boats to Beaufort to trailer home.

We were off before dawn in fog and cleared the river mouth by mid morning. We were making good time close reaching out the river in a gusty 20 knot northeaster. As we eased sheets for the run across Pamlico Sound to the ferry dock at Cedar Island we went to the second reef and were making speeds in the low teens in gradually building wind and seas. As we closed on Cedar Island, Pamlico Sound was a mess!! 30 knot wind plus gusts and 4 to 7' seas in six to 12 foot water depths. We were down to



**Chat passing Whisperings!**

just the two top battens of the mainsail. Landing at the dock was too exposed so this was out. We should have diverted to Beaufort directly but instead continued downwind into West Bay where we were able to land TO for a 2 mile walk through marsh to his car. Clearly, we were now embayed with the wind steady at 45 and with higher gusts. We decided to remain anchored where we were as moving was too dangerous particularly with one boat now single-handed.

A very shy lee protected the boats from the NE and kept the seas at two to three feet but refraction put these off the port bow where there was considerable slamming. Several times during the night we took solid water over the port hull. While Evelyn and I vegged out in our two hulls, John had only his dog for company and we all had trouble relaxing with the noise, motion and concern for our limited options. We were constantly on guard for a shift to the west which might force us to intentionally beach the boats. "Waldo", the automated weatherman, even joked that "...this Memorial Day would not be a good day to go to the beach, it would be a good day to go to the movies!" All craft were advised to stay in. Hatteras Inlet was forecast to have a 12 foot storm tide.

*Tuesday May 29 to Thursday May 31*

Tuesday John called on the radio to say he was taking the dog to the beach and the forecast was for 35 knots until late in the day. We were down to one quart of water but there was still no question of being able to retrieve the anchor and get clear of the beach. After another long night, the morning brought 25 to 30 knots. John rowed over with water and it was very nice to be able to visit and share a cup of coffee. He said he was a little shaken up but the dog was OK.

The Coast Guard and an Oriental, NC marina dock master had advised we could escape West Bay to leeward through the "Old Canal" (reputedly dug by Indians) and enter the Neuse River to reach the ICW to Beaufort. This we did, departing under small jibs alone, and later had a marvelous day racing along and sightseeing in full sun and light airs

We spent the last night at the Beaufort Docks and the dock master showed us how to lasso a piling from 15' away. We ate a modest dinner ashore and overheard that we had just survived "the storm of the Century". I'm sure there will be many more.

*-Tom and Evelyn LaMers*

# Newport Unlimited Regatta



photos by Tom and Judy Cox



**Top left: International Canoes take off. Top right: Ira Heller sailing a Rave. Bottom left, Craig Gardner's Scout. Middle right: Pat Harris in Gypsy Heart. Left: Dennis Neumann and the winning team from Milagro.**

# Nema Season 2000 Trophy Results

## Rinderle B Point Scoring

The "Rinderle B" scoring system was devised in the early 80s by Jim Rinderle of Marblehead to make a more equitable way of scoring a series of races that varied considerably in fleet size.

The goals of the system were to:

- Preserve a bonus for winning
- Have a scoring system that reflects the fact that it is harder to be first among 8 than to be first among 4.
- Have a scoring system that reflects the fact that it is more difficult for an average racer to achieve a mid-fleet finish in a small fleet because small fleets usually include a large fraction of the best sailors (e.g. bad weather results in a small fleet because the weaker sailors stay home)
- Create a scoring system that creates an incentive to race

The existing scoring schemes at that time did not have all of these characteristics. Rinderle developed a series of candidate scoring tables, dubbed "Rinderle A", "Rinderle B", "Rinderle C" etc. The consensus of a group of race organizers was that "Rinderle B" seemed to best balance these somewhat competing goals.

Here is the detailed formula:

Points=  
 $100 * (1 - \exp(-(s+4.6)/5.4)) * (s-p)/(s-1) + 10.5$

where **s** is the number of starters and **p** is the place.

NEMA uses this scoring system to determine the season trophy winners. The table to the right provides the Rinderle Point scoring for the 2000 season. (Thanks to Ira Heller for maintaining this table all season.)

Boat	Skipper	Type	Owen Mitch	BBB-1	BBB-2	Cor200	Black Dog	BBR-1	BBR-2	BBR-3	NU-1	NU-2	RRR1	RRR2	Points	Best 7 Days
MILAGRO	Neuman	F-9A	91.2	75.0	92.6		24.5	93.9	81.3	93.9	94.7	100.0	10.5	90.3	847.9	737.9
TRI ME	Gleason	F-31	62.1	91.2	78.5		89.7	81.3	93.9	81.3	100.3	69.3	94.7	100.3	942.6	732.7
SWAMP FOX	Watson	Custom 35		62.1	67.1	130	100.1	61.1	71.2	61.1	46.0				598.7	552.7
HEAT WAVE 2	Heaton	F-25C						71.2	61.1	40.8	54.8	59.5	72.6	46.0	406.0	406.0
SCOUT	Gardner	F-25C		23.4	44.5						85.9	84.1	77.0	77.0	391.9	
WHITE HEAT	Bluestein	F-27			10.5		94.3	50.9	30.7	20.6	72.6	79.1			358.7	358.7
LITTLE PIGS	Lawson	F-28R	75	36.3	33.2		85.0	30.7	20.6	30.7					311.5	311.5
BLUE MOON	Spalding	F-25C									81.4	74.2	81.4	72.6	309.6	
ANDIAMO II	Laskey/Harvey	F-31					71.0				59.3	44.8	63.7	68.1	306.9	
PLAN A	Kenney	F-24 Mk-II						40.8	40.8	50.9	77.0	93.9			303.4	
MARGARET	Doelger	AMG 35				21	80.4	20.6	50.9	71.2	37.1				281.2	
TRICERATOPS	Alvord	F-31R	23.4				57.1				63.7	64.4	54.8	10.5	273.9	
MOTHRA	Miller	F-27	49.2	49.2	55.8								53.9	63.7	271.8	
TRINITY	Pellegrini	F-31R				57.4							85.9	85.9	229.2	
HOT FLASH	Korneyi	F-28R	10.5				61.7				50.4	35.0	50.4	10.5	218.5	
BARBARA ANN V	Bedell	F-24 Mk-II		10.5	10.5		66.4	10.5	10.5	10.5			46.0	32.7	197.6	187.1
STRIDER	McAlpine	F-24									90.3	89.0			179.3	
FRIENDS	Greene	Greene 35				175.6									175.6	
MOUSE CUBED	Glandon	F-24					47.8						37.1	50.4	135.3	
BAREFOOT	Cabot	F-27					38.4				41.5	49.7			129.6	
ELEKTRA	Pavel	F-28					43.1						23.8	54.8	121.7	
MOONCUSSEY	Larcen	F-27									23.8	30.1	28.2	7.1	119.2	
ANDIAMO	Burkert	F-27											68.1	41.5	109.6	
BLACKBIRD	Nicholson	F-28R											41.5	59.3	100.8	
TRIAD	Cox	Newick 42				99.2									99.2	
CHAT DE LAMER	LaMers	Seawind 24+2									32.7	54.6			87.3	
GYPSY HEART	Harris	F-31R									68.1	10.5			78.6	
SKATEAWAY	Burrage	Burrage 40					75.7								75.7	
WHISPERINGS	Cleary	F-27									28.2	39.9			68.1	
TRIPTYCH	Hankins	F-27					52.4								52.4	
ARRIBA	Hall	F-31	36.3												36.3	
MOONDANCE	O'Neil	F-27									10.5	25.5			36.0	
NEPTUNE'S CAR	Siemsen	Shutt 50									14.9	20.3			35.2	
VADO PAZZO	Spicuzza	Stiletto 23									19.4	15.4			34.8	
SILENT WONDER	Webb	Contour 34					33.8								33.8	
FLO	Tarjan	Outremer 44											19.4	10.5	29.9	
WINDSONG	Mann	F-31R					29.1								29.1	
WILD THING	Dube	F-24 Mk-II											14.9	10.5	25.4	
CHRISTINE	Worthington	RC27					10.5								10.5	
LUCILLE	Chase	Wesport 25					10.5								10.5	
MAINECAT 30	Milin	MaineCat 30					10.5								10.5	

# Black Dog Dash



Top: the NEMA fleet rafts up on Vineyard Haven Beach  
Middle Row: (left) capsized catamaran, (center) Richard Bluestein's White Heat takes second, (right) NEMA members watch the awards ceremony



Top: Nick Bryon-Brown helps to rite the capsized cat; Right: Don Watson (center) shows off Swampfox's first place trophy, flanked by his crew (L to R) Tom Cox, Nat Watson, Billy White, and Chris White.



Dennis Neumann's Milagro



Bill Doelger's Margaret

# When Lightning Strikes

By Tom Cox

**FLASH - CRACK- BANG! "Boy, that was a close one. I'm glad I waited out this squall at home," I thought while viewing the storm from the safety of my top floor home office. An hour later I dinghied out to Triad to bring the latest round of stores in preparation for our annual pilgrimage to Buzzard's Bay and the NEMA summer racing season. As I approached her mooring, she seemed a bit low in the water ...**

but was I ever shocked to find the main hull awash waist deep in water. The amas were supporting the vessel level but down about 18 inches from her normal waterline. I fished out my mask and snorkel from the dive bag floating in the aft cabin, and plunged overboard; it didn't take long to find a shattered patch of fiberglass just below the surface of the water on the port side of the aft cabin. I climbed back aboard, donned my shorty vest and dove into the aft cabin; I quickly found the hole blasted through the planking between two stringers located directly beneath and partly behind the battery switch panel. The batteries were submerged, and acid was spewing out of the "sealed" caps of one (a West Marine gelcell). I regained the cockpit, waded forward, and tested the electronics. Surprise! No power.

I had left the handheld VHF charging at home, but the cell phone came in handy. I called the Coast Guard who declined any help (boat on the mooring, not sinking, no-one in distress), but they did me the favor of contacting the Harbormaster. I had stuffed a towel into the breach with a screwdriver by the



Aft hole outside. Fiberglass sheathing buckled outward.

time he arrived. Between his one inch electric bilge pump and my bucket we gained 6 inches in fifteen minutes, far too slow to get him home by supertime (it was already 4:30 pm). He called the coasties, told them Triad was about to sink, and requested their 4 inch crash pump. Fifteen minutes later, two eager Guardsmen appeared in a red inflatable. In ten minutes the gasoline-powered pump was chugging and the boat was de-watered. After a brief back-and-forth between with the head offices to determine which agency was responsible, the harbor master took his leave. The Guardsmen conferred, and asked me what I wanted to do – call Boat US for a tow to the local emergency approved yard, stay aboard and keep pumping, or let her settle again on the mooring. The pressure was on, water was still pouring in through the aft cabin, and I didn't relish the idea of a tow to a facility which I



Aft hole inside. Darkened area is moisture, not char. Planking buckled inward.



knew would have trouble hauling. I convinced them to stand by while I put a patch on the outside. They did more than stand by – they helped hold the dinghy in as I screwed an 8" x 12" inch patch of 1/8" plastic teflon coated with underwater epoxy over the hole. After a hard half hour of hammer and screwdriver, the patch was secure. We pumped out again, and I bid adieu to my helpers. I surveyed the inside and outside of the boat once more, and discovered a spot on the port side forward which looked like it had been hit, the inside planking cracked and weeping. I was puzzled how a floating object had developed sufficient force to penetrate the hull and cause this amount of damage.

It wasn't until the next day when we hauled out that the mystery was solved. As soon as Triad was chocked on the hard, the surveyor was perusing the damage (he conveniently lives next door to the yard). He opined that the damage was due not to outside impact, but was more consistent with lightning damage; a charge had migrated through the hull in an area where water was trapped in a void between the layers of cold-molded planking. The charge had vaporized the water, and the expanding steam had blown apart the hull – the interior planking was buckled inwards, and the exterior planking and fiberglass sheathing had buckled outwards. A subsequent examination of the masthead with binoculars revealed the Metz VHF whip antennae was blown apart, and soot streaked the mast. I managed to patch the good bat-

tery (a truly sealed Interstate gelcell) into the wiring harness (all the tabs had corroded off the wires on the positive side) and tested the electronics – all kaput. The B & G service center examined the gear, and said they found typical lighting damage– the strike had come in the masthead wind instrument, jumped across the circuit board in the terminal box and out the depth meter. It seems the bulk of the charge had coursed through the VHF antenna, jumped through the radio and out the ground wire into the wire harness. It then found the path of least resistance to ground (the water) where the wires ran by the waterline, under the switch panel aft, and from the wire to the depth finder transducer forward; unfortunately, the hull got in the way. Damage to the carbon mast was minimal, a small patch at the masthead where epoxy boiled out.

What to do to prevent the damage? The anecdotes vary, and the opinions are diverse from "there's nothing you can do" to "bond everything". What follows is the result of my research on the internet, lifted liberally and summarized below, principally from Kathy Barron, from *SailNet*, and John Payne, from *LiveAboard Magazine*.

From *SailNet*:  
[www.sailnet.com](http://www.sailnet.com)

## The Path to Lightning Protection

You never know when a lightning storm will catch up with you.

It is important to understand that adding a lightning-protection system to your vessel may actually increase the chances of being struck. You are inviting the lightning to come aboard and use your vessel as a path to ground. With this invitation comes the responsibility of installing the correct system—remember that the reason for installing the system in the first place is to minimize damage to the boat and injuries to the crew.

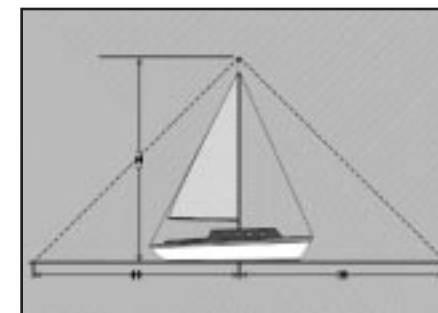
The basic lightning-protection system is based on a theory developed by Michael Faraday, called the "Faraday's Cage." The principle is to provide a

grounded structure where all the parts are bonded together and have the same electrical potential. This is accomplished by connecting the mast and any large or dense metal objects with large copper conductors. Copper is preferred over aluminum because it's more conductive per square inch than aluminum and it is also more corrosion resistant; consequently it takes less copper wire than aluminum wire to accomplish the same conductivity.

Equipment requiring bonding to the ground system includes the engine, refrigeration and AC compressors, rails, chainplates, keel bolts, metal tanks, steering pedestals, galley ranges, sea-cocks, and propeller and rudder shafts; also, shrouds, stays, and all tracks, including the sail track on a non-conductive mast or boom.

Sailboats are at a great advantage when it comes to lightning-protection because of their masts. A spar less than 50 feet in length off the water offers what is called a "cone of protection" or "umbrella" when properly fitted with a lightning protection system. The entire area and any object falling within a 45-degree angle in a straight line off the top of a grounded mast will fall within this cone of protection.

For vessels whose spar is greater



Masts less than 50 feet off the water have a wide cone of protection.

than 50 feet off the water, the protection zone is based on a different set of values. The lightning strike zone is defined as a concave arc with a radius of 100 feet drawn from the top of the mast to a tangent point on the water. Thus a mast precisely 100 feet off the water's surface would have an arced protection zone that would extend 100 feet in front of the

mast's base. Spars over 100 feet off the water do not garner any larger protection zone.

## Practical Application

The main components of a lightning-protection system are an air terminal, heavy-gauge main conductors, secondary conductors, bonding conductors, arrestors, fasteners, a ground plate or ground strip, and equalization bus. It is not recommended that the VHF antenna be used for an air terminal because most antennas don't meet the requirements for conductivity. In order to understand the installation of the lightning protection system, you need to know these terms:

**Air terminals** are pointed copper or aluminum rods 12 to 24 inches in length located at the top of the spar. They act to attract, direct, and dissipate an electrical charge.

**Ion dissipaters** are stainless steel wire brushes, shaped either as a spiral or a feather-duster. These should not be used to replace a well-grounded and bonded lightning-protection system, but can be used in conjunction with it. They may, though, replace the traditional air terminal, although stainless steel is much less conductive than copper or aluminum. The theory behind these devices is that they neutralize the buildup of static charges on the ground by dissipating ions into the atmosphere prior to a lightning strike.

**Main down conductors** carry the current from the top of the mast to "ground" and need to be an insulated, flexible, compact-stranded, concentric lay-stranded, or a minimum 20-gauge solid copper ribbon. The American Boat and Yacht Council (ABYC) recommends a minimum size of No.4 AWG copper wire as the main down conductor. This conductor will be attached directly to the grounding plate or grounding strip.

**Secondary conductors**, which are also referred to as parallel conductors, provide a separate conductive path from shroud and stay chainplates to the ground plate, strip, or equalization bus.

*continued on page 12*

## When Lightning Strikes

*continued from page 11*

They are a minimum size No.6 AWG copper wire by ABYC standards. These conductors should not be laid in close proximity to the vessel's electrical system wiring or electronics ground system.

**Bonding conductors** are used to equalize the current potential between large, dense metal pieces of equipment such as keels, tanks, and engine block, and to bond them into the system. They eliminate side flashes (electrical current jumping from one conductor to another seeking an easier path to ground) when such equipment falls within six feet of the main and secondary conductors. They are a minimum size No.8 AWG copper wire.

**Ground plates** are mounted on the exterior of the hull, preferably as close to the mast as possible, and should be made of copper, Monel®, or bronze material that is corrosion resistant. This plate transfers the electrical current from the down conductors to the water and must have an area of at least one square foot. Props, rudders, and struts that meet these requirements can be used, but remember that the longer the run of a conductor from the mast, the greater the electrical resistance. The engine and mast should be bonded directly to this plate. A ground strip can be used as an alternative to a ground plate.

**Ground strips** of copper or aluminum are installed on the exterior of the hull running longitudinally from directly under the spar to the end of the transom. The total length should never be less than four feet. The copper or aluminum strip should be at least 3/16-inch thick and 3/4-inch wide according to ABYC standards. Secure the strip with galvanically compatible thru-bolts at each end and spaced two inches apart down the length of the strip.

**Equalization buses** are made from 20-gauge copper strap that is laid longitudinally in the bilge in close proximity to the ground plate or ground strip and connected to the plate/strip at both ends with bonding conductors. All secondary

and bonding conductors not connected to the ground plate or strip are attached to this bus so as to provide a low-resistance path to ground.

**Lightning surge arrestors and air gaps** prevent damage from a lightning strike to electronics and electrical circuits by rapidly reducing the voltage surge to a lower level. The air gap is a form of arrestor in which a small air space exists between two metal plates.

**Connectors** should be of non-corrosive metals of similar composition to the conductors themselves in order to reduce galvanic action and to maintain an equally low-resistance throughout the system. If for any reason dissimilar metals are used, stainless-steel connectors should be employed.

## Installation Notes

A metal mast is a direct and low-resistance path to ground. A down conductor is not required, but an air terminal should be affixed at the top of the spar. Bond the foot of a metal mast to the grounding plate or grounding strip with No. 4 gauge copper wire at deck level if it is deck stepped, and at keel level if keel stepped. If a radio antenna extends above the air terminal, it should be either relocated or removed from the top of the spar.


If the spar is wooden or of a composite material such as fiberglass or carbon fiber, an air terminal should be attached at the top and a heavy gauge conductor should be run down the full length of the spar as straight and directly as possible to a ground plate or ground strip on the hull exterior.

The bonding of shrouds and stays should not have less than the collective conductivity of the main down conductor of No. 4 AWG wire. These secondary conductors should bond directly to the chain plates and from there directly to the ground plate or strip. If a strip is used, the backstay and engine's negative terminal should be connected to the aft end of the strip. This connection to the engine will help alleviate stray currents imposed by the thru-bolts where they may lay in bilge water.

Seacocks and thru-hull fittings should not be grounded to the main down conductor, but to the ground plate, strip, or equalization bus by way of bonding conductors. There is still considerable debate as to whether seacocks and thru-hull fittings should be part of the lightning-protection system since they are sometimes used as part of the vessel's electronics and electrical grounding system.

If possible, surround electronics in a metal casing and bond the case with a minimum No.8 AWG copper wire. Add lightning surge arrestors to all wiring leaving and entering electronic equipment and never ground your electronics to the lightning protection system.

With the installation of a good lightning protection system should come the peace of mind that if your vessel is struck, the damage to it and the crew should be minimal. There is no guarantee that there will be no damage, but minimized and controlled damage. Lightning continues to be one of nature's great unknowns, and new theories about the mechanics of lightning are still under study. After all, it was only recently that the "ground to cloud" theory of lightning was put forward, revolutionizing the way we think about the prevention of being zapped.

*Reprinted courtesy of*  *Kathy Barron and SailNet*

*From LiveAboard Magazine:*  
[www.lmmc.com/articles/lightning.htm](http://www.lmmc.com/articles/lightning.htm)

**The Great Myth.** Lightning rods and grounding actually attract lightning strikes! The presence of a properly installed lightning protection system will give a number of advantages:

- It will safely ground the strike energy
- It will in most cases limit the damaging effects of heat and reduce the current levels flowing, as well possibly the length of time the strike takes (this is in milliseconds). This reduces damage to equipment and crew
- In GRP vessels, in particular multihulls, under certain weather condi-

tions, a static charge builds up on the deck. It is my contention that ungrounded vessels actually promote strikes to the vessel due to this condition. Additionally grounding the mast dissipates this charge, and in the process removes a common cause of radio (RFI) noise that occurs as small arc occurs as the static charge goes to ground.

**Mast.** Lightning will generally strike the highest point, and take the path offering the lowest resistance to ground. The mast is usually the strike point. Note that a stainless steel VHF whip does not constitute any protection.

**Mast Spike.** The mast spike ideally should be a copper rod with pointed end. To avoid metal interaction, stainless rods are commonly used but should be of a thicker section than the more conductive and lower resistance copper. The spike should be at least six inches higher than any other masthead equipment, including VHF aerials. Many commercial units (Dynarod and Seaground) have an offset in the rod, which although not being the required straight section would be satisfactory. The purpose of the point being sharp is that it facilitates what is called point discharge. Ions dissipate from the ground and effectively cause a reduction in potential between the cloud and the sea. In many cases the strike may be of lower intensity or not occur at all.

**GRP Vessels.** A keel acts as a good ground and is sufficient. Bridge out with a stainless link at least two keel bolts to spread the contact area. On multihulls you have to install a large separate ground plate, such as a radio ground (Dynaplate, Wonderbar or Seaground). This will ensure that there is a large and efficient ground area. Do not use the radio RF ground plate as the lightning ground. Never bond the lightning system to the corrosion system bonding, machinery or electrical system negatives or grounds. Never bond the lightning system to bronze through hull fittings (unless you want to sink the vessel!).

**Wooden Vessels.** Wooden vessels normally have a metal mast track. The track should be properly grounded. If possible a copper strap can also be run, although this is not always practical. Direct bonding to a ground plate or the keel should use the same grounding method as GRP.

**Emergency Ground.** A heavy gauge copper cable can be clamped to a stay over a half-meter section. The other end should be clamped to a ground plate, and hung over the side. Do not use chains and anchors (another great myth), as they are ineffective as a ground.

**Bonding.** Most authorities recommend that all stanchions, chainplates, and large metallic equipment such as stainless water tanks should be bonded to the lightning ground. Failure to bond can result in side flashes as these can offer an alternative path. The bonding should be made at the point closest to the main conductor. I prefer not to bond the stays and chainplates as often recommended. My reasoning behind this is that if a good low resistance path is made from mast to keel or groundplate the strike energy will be directed that way. Grounding stays offers alternative high resistance paths, encouraging side strike activity. Current flows can also cause crystallization and permanent damage to stainless stays and fittings in a severe strike (try and get that past the insurance company!). Bonding must be undertaken with care. Dissimilar metals such as the aluminum mast copper strap, and steel must be interconnected to ensure no galvanic corrosion can occur. More importantly interconnection of various grounding systems must be undertaken with great care. It is only necessary to bond internal metallic equipment within six feet of the mast. In practice this is rarely water tanks under bunks etc, but should include tankage under the cabin sole.

*Reprinted courtesy of John Payne and LiveAboard Magazine*

## Thunderstorm Precautions

Being on board a sailboat during a thunderstorm poses an immediate danger to the crew, whether or not there's a lightning protection system. If leaving the boat for shelter on land is not possible when thunderstorms roll through, safety precautions should be taken immediately by the crew to minimize personal danger.

- Discontinue any exterior activities and move inside. Avoid any activities that might provide a connection between your body and the water, even something as seemingly minor as fishing.
- Stay low in the vessel and move as close to the center of the boat as possible.
- If possible, immediately disconnect all electronics, especially the VHF or any other radio connected to an antenna. Lower or remove the antennas if possible. Do not use any telephone, including cell phones.
- Do not come into contact with any piece of equipment that is bonded to the lightning protection system, especially two components at the same time. Your body then becomes a path for electrical current if the vessel is struck. Keep away from all metal objects whether or not they're bonded to the system.
- Do not go near the spar's compression post if it is deck stepped, and stay away from the spar itself if it is keel stepped—remember that this is the main conductive path.
- If the vessel is struck, immediately check the seacocks and thru-hull fittings to be sure they're still intact. Always have wooden plugs on hand in a variety of sizes that fit the vessel's seacocks.

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[www.sailnet.com](http://www.sailnet.com)

# The RACE, Update

## CHALLENGERS

### Club Med/France-New Zealand



Soon after launching *Club Med*, and after only five hours' sailing, Skipper Grant Dalton was already flying a hull and recording a sprint up to 34.7 knots. And less than three weeks later, during her qualification run from Cadiz (Spain) to San Salvador (Bahamas), she smashed the world record for the greatest distance sailed in 24 hours: 625.7 nautical miles, at an average speed of 26.07 knots. On the second record-breaking attempt from New York to UK, as *Club Med* was sailing at 25 to 30 knots,

the forward tip of her port hull broke off suddenly, probably due to an encounter with a piece of flotsam. The catamaran returned to Newport and was immediately shipped to France for repairs. After 6 weeks of work, she was relaunched on September 29.

[www.therace.clubmed.fr](http://www.therace.clubmed.fr)

### Polpharma-Warta/Poland



Skippered by Roman Paszke, the Polish catamaran was the first to qualify for The RACE. In February 2000, she completed the Cadiz (Spain)/San Salvador (Bahamas) transat. The goal: to cover in less than 15 days, 15 hours, 31 minutes,

47 seconds, the route used by Christopher Columbus to discover America. Enduring electrical failures and a dismasting, she crossed the finish line under jury rig after 14 days, 6 hours, 20 minutes, 24 seconds.

[www.race2000.wp.pl](http://www.race2000.wp.pl)

### Playstation/USA

First of the challengers to sail – *Playstation* has been in the water for more than a year. The catamaran of American Steve Fossett qualified between New York and Lizard Point (UK) on her second attempt, in June 2000. During the crossing she often attained speeds in excess of 30 knots. Fossett is currently modifying the boat by stretching her from 105 to 125 feet. "Her sail area will not change but on stretching the boat we will be able to better control her power," says Fossett. "The bows and forward beam will be less likely to dig into the waves, and windward performance should be improved."

[www.fossettchallenge.com](http://www.fossettchallenge.com)



### Team Philips/UK

Skippered by Pete Goss, *Team Philips* is definitely the most radical multihull to be dreamed up for The RACE. On March 29, on her third day of training offshore, the forward section of the port hull began breaking off. Blamed on improper bonding of the longitudinal reinforcing "strakes", the boat has undergone four months of intensive reconstruction.

Relaunched on September 23, Team Philips is headed for New York. In November she will return to Europe, ready this time to qualify for The RACE.

[www.teamphilips.com](http://www.teamphilips.com)



### Millennium Challenge/UK

Tony Bullimore (UK) has just finished transforming the platform of one of the most prestigious thoroughbreds of recent years, Peter Blake's *ex-Enza*. No longer the same boat, *Millennium Challenge* has received new bows that do much more than increase her length from 92 to almost 100 feet. Advised by designer, Nigel Irens, Bullimore has raised the deck over the whole forward half of the hulls, by as much as 15.7 inches at the forward crossbeam. They have also reshaped the underside of the central pod, making it less vulnerable to the slamming of waves.

[www.lionheart-campaign.co.uk](http://www.lionheart-campaign.co.uk)



### Team Adventure/USA

Scheduled to launch in late October, *Team Adventure* is the sister ship of *Club Med* and *Code One*, whose molds she used. Skipper, Cam Lewis, is the only challenger to have taken on the Southern Ocean on a catamaran (Commodore Explorer). Familiar with the 85-knot winds that lay in ambush at Cape Horn, Lewis has customized the boat by moving the steering stations forward to just abaft the coachroof cuddy, for better protection. There will also be a small cockpit at the foot of the mast to make working safer. In addition the transoms will be more vertical than those on *Club Med*.

[www.teamadventure.org](http://www.teamadventure.org)



### Code One/France

The second maxi catamaran designed by Gilles Ollier will be co-skippered by Frenchman Loïck Peyron. Recently launched on October 13, Code One is almost identical to *Club Med*, except that the rig and winch arrangement at the foot of the mast have been thought out differently. In addition, with more upright transoms and shortened bows, the overall length of *Code One* is slightly less.



## BARCELONA

Port Vell Marina in Barcelona is where the Official Village of The RACE will open its doors on Dec. 9, 2000. The Official Village already has a multitude of activities planned out, and ideas continue to pour in from everywhere. Giant screens, sailing simulators with on-board images, exhibitions, and twice-daily slide shows comprise a busy program. It will allow the public to get acquainted with the giant boats of The RACE notably through a "learning circuit" whose various stages will recreate certain aspects of life on board: running across the trampoline net of a multihull, hoisting a heavy sail, and enjoying a virtual sailing experience in a 3D cabin.

### Calendar of Events

**Dec. 9** - Deadline for the arrival of the challengers in the marina. Opening of the Official Village.

**Dec. 15** - Official inauguration of the Village. Unveiling of a sculpture commemorating the event. Inaugural celebrations with a sound-and-light show, fireworks and a giant screen projection.

**Dec. 23** - Presentation to the general public of the boats under sail. Timed runs in front of the harbor.

**Dec. 25** - Christmas festival

**Dec. 29** - Official opening ceremony of The RACE.

**Dec. 31** - The challengers' boats will leave the marina at about 10 a.m. and will sail a course around several buoys before crossing the starting line.

[www.therace.org](http://www.therace.org)





NEW ENGLAND MULTIHULL ASSOCIATION

P.O. Box 1152, Boston, MA 02205

**Next NEMA Meeting**  
7 p.m. Thurs., November 2  
Savin Hill Yacht Club, Boston  
Guest Speaker: Gerard Sperry  
Builder of Conser 30  
(see page 2 for more info)

First Class Mail

**FOR SALE**

**VAL-32 components.** Main hull-vaka (420 lbs.) and two amas (1961 lbs.) with decks (62 lbs) unattached. Production hulls built with Vinylester and Triaxial glass. Production molds for akas (25' beam) and main hull deck (center cockpit). Wing aka plan set, mast (38') and boom. Call 508-339-9671, 6-9 p.m. EST. \$6500.

**1984 NACRA 5.8 na.** Hulls are sound, tramp needs restitching, sails are in ok shape (need to be replaced for racing). Good beach boat for lake, daggerboards need fairing, new main halyard. Trailer and one harness included. Spending way to much time on the F-boat. email me at Jon.Alvord@Valley.net for more info.

**10 ft. Achilles inflatable and 5 hp. Tohatsu outboard.** New over \$2000. Will sacrifice for only \$1200. Lightly used, like new condition, very light -- only 80 lbs. Inflatable floor and keel, model LSI-104. Call Bill 508-755-7586.

**Seawind 24' trailerable cat.** 1988, main, jib, genoa, spinaker, new custom hard and soft decks, depth meter, porta-potti, 92' 8 hp Tohatsu, '97 fully rebuilt trailer. \$15,000. Call 860-742-9827 (CT)

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