

GMT Carbonics 27

GMT Composites

Advanced composite engineering and manufacturing
for marine and industrial applications

Product Bulletin #27
Summer 2009



Royal Blue's owners have ambitious cruising plans: Chesapeake for this year's show, New England via Bermuda in 2010, then Europe in 2011.

Yachtsman "lightens ship" with GMT mast and PowerFurl boom

Ron Drucker, retired President of railroad giant CSX, knew what he wanted but knew serious engineering was required to achieve it. Going from his Hylas 54 to a new Hylas 70 meant shedding two feet of draft from the original design in order to sail safely into his homeport of Key Biscayne, Florida. GMT was a big part of the engineering solution.

A Hylas 70, the latest addition to the Hylas family of offshore yachts designed by German Frers, is normally offered with either a fin keel or keel/centerboard. Both were far too deep, so Frers was asked to design a shoal keel to reduce the draft to 7'-5". By using infusion techniques for molding the hull, nearly two tons of weight could be shifted into a bulb, but reducing weight aloft was key to the reduction in draft.

GMT carbon spars saved 45% of the weight of an aluminum mast and boom, and replacing rod with PBO rigging saved over 40%. These two steps removed more than 1300 pounds, with much of the weight high up where it would most affect heeling moments. "Yes, this is a more expensive solution, but it's very worthwhile for us," Ron said.

"In choosing a builder for our spars, we had three criteria: quality, experience and price. We had visited GMT and another builder several years ago; we talked with them and a third composites

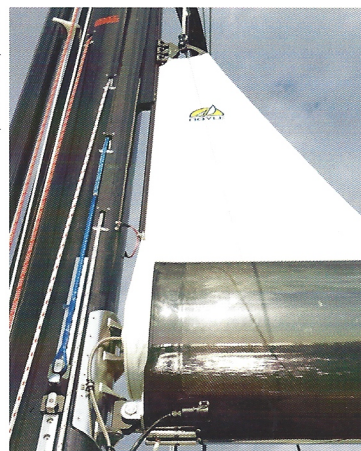
company. GMT was the only company who was strong in all three of our important criteria. Peter Grimm of Doyle Sails Florida had experience with GMT, including the PowerFurl boom, and rigger Brad Storm was also comfortable with GMT. I wanted to use a single source to supply the entire rig, and GMT was both agreeable to this and capable."

Answering questions about his PowerFurl boom, Drucker said that his wife, Lisa Ware, "has mastered the art of setting the sails. She feeds the mainsail into the track. I just push the button when she tells me." Sounds like a happy crew to us.

Royal Blue is named for the streamlined train that once ran from Washington to New York. You can never take the railroad out of a railroader!



Lighter, stiffer and easier to maintain than aluminum; beautiful clear coat finish.



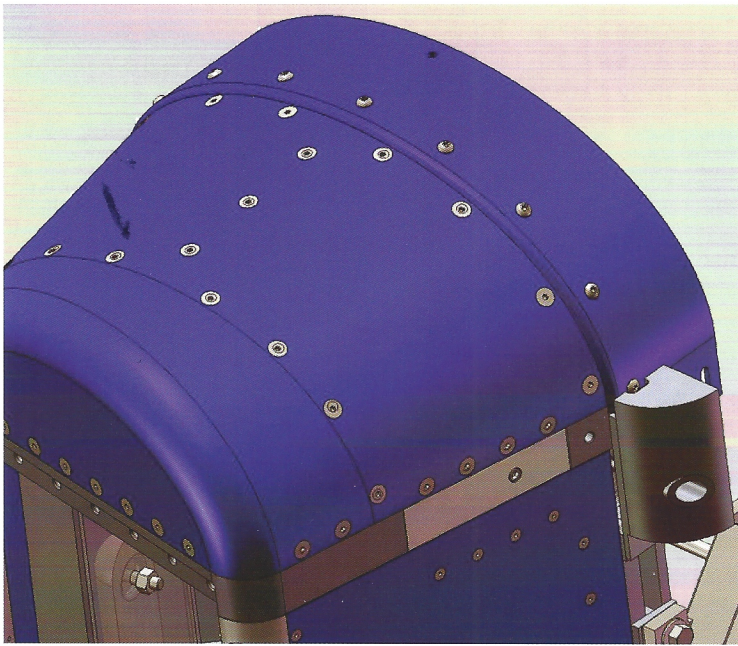
PowerFurl: push-button simplicity that lets one couple manage a 70-footer.



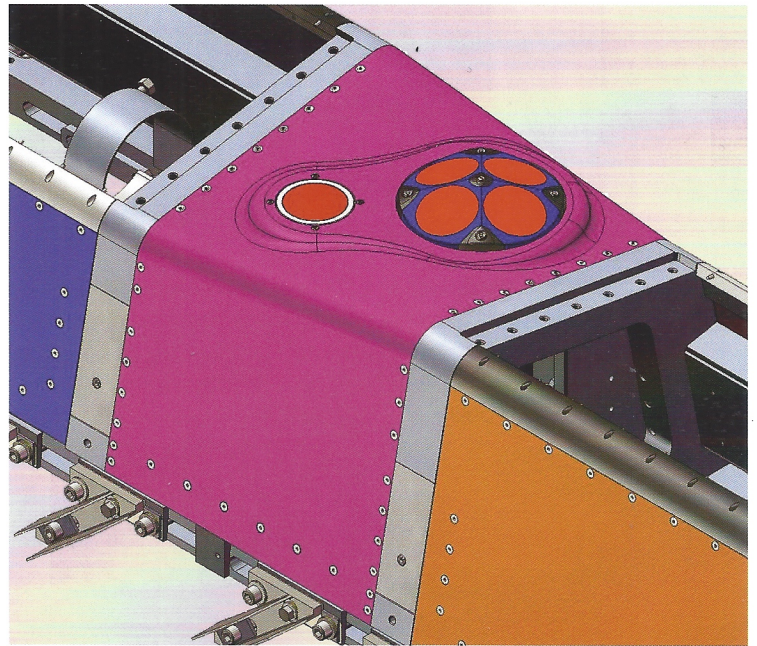
Lisa Ware, Ron Drucker's wife, loved her half-hour of masthead sightseeing 95' up!

photo: Billy Black

photo: Billy Black



A GMT carbon fiber fairing designed for autonomous underwater vehicles (AUVs).



The AUVs will be used for classified Naval Undersea Warfare Center missions.

Secret stuff: you can ask but we can't tell

These "camera tubes," built for Northrop-Grumman, are battle-field-tough, sealable, carbon composite containers. They must be doing the job because GMT has been contracted to build hundreds more and to produce a second, larger version. The units are light enough to carry over rough terrain, strong enough to stand on or drop, precision-built for mounting sensitive instruments inside, and moisture proof.

They have "lenses" and power plugs, and some refinements best not mentioned. The sand color might be related to their destination, and we infer they work under battlefield conditions.

We've also started producing carbon parts for the Naval Undersea Warfare Center (NUWC). These are fairings for autonomous underwater vehicles (AUVs), unmanned submersibles whose mission we're not cleared to

know. These AUVs are currently being ocean tested.

GMT has built fairings and hulls for other oceanographic and survey AUVs. Carbon fiber is a good choice for its strength, stiffness and low weight. In addition its radiolucency allows scanning beams to pass through without interference, a useful attribute for precise data collection and the protection of delicate scanning instruments.



Carbon fiber "camera tubes" ready to march.

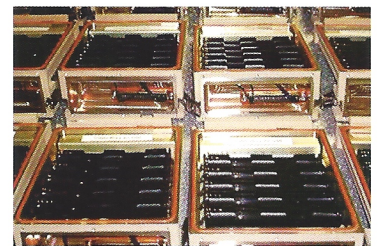
GMT's carbon rigs in Marion-to-Bermuda race



George Denny's beautiful fleet; Restive, on left, is going to Bermuda.

At least six competitors will have GMT carbon spars in the biennial Marion-to-Bermuda Race. Last year in the Newport-to-Bermuda Race our rigs won a first (John Watts' *Bandera*), two seconds (Bob Forman's *Jacqueline IV*, Andre Laus' *First Light*) and a third prize (Chris Culver's *Cetacea*).

Chris is back this year with his Sou'Wester 59, with a GMT furling mast. Also racing will be *Galileo*, Stefano Pacini's Sou'Wester 51; Ed Sisk's 51 *Experience*; Andrew Norris' Tripp 48 *Katrinka*; Sheldon Brotman's Canning 48 *Whisper*; and George Denny's *Restive* (an Alden 48 built in wood by Brooklyn Boat Yard). We wish the group good results and a safe trip!



GMT-assembled portable power packs.

Assembly work

Because of our reliability, once in a while we're asked to build items that are more than carbon composites. Shown are portable power packs for Ethernet-based equipment going to the military in the Middle East. GMT provides the aluminum housings, circuit boards, connector cables and full assembly. Have a special project? Just ask.



SummerWind's carbon booms preserve her lovely and historic appearance.



On SummerWind pocket booms allow long battens and make sail furling/stowing easy.

Faux bois booms preserve authentic look

GMT recently supplied carbon fiber pocket booms for *SummerWind*, a 1929 schooner designed by John G. Alden. These GMT booms appear to perfectly match her sitka spruce masts, even when viewed from on-deck. In reality they weigh only a fraction of her original booms and have numerous details that make *SummerWind*'s rig stronger and simpler to control and easier to maintain.

This classic 100-foot (30-meter) schooner was originally launched as *Queen Tyi* by C.A. Morse & Son in Thomaston, Maine; she is one of the few surviving large schooners from that era. She served as a Coastal Picket in WW II and then, as *Sea*

Gypsy, was a charter yacht in the Mediterranean.

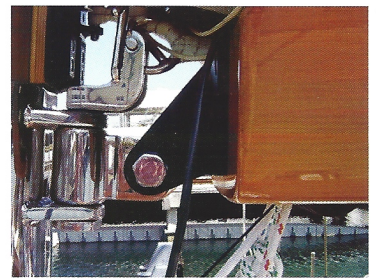
A businessman from Fort Worth acquired her and, inspired by the Frank Sinatra song, he renamed her *SummerWind*. He and Karl Joyner, the yacht's experienced captain, arranged for her magnificent rebirth after a two year restoration which included design consultation by naval architect Niels Helleberg. The plan is to race *SummerWind* on the classic yacht circuit, beginning this summer.

The owner wished to maintain *SummerWind*'s classic appearance while modernizing her rig. A section of her rotted spars was sent to GMT so that the faux bois

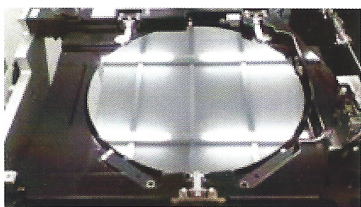
paint finish could be matched in color and grain pattern. The clear polyurethane overcoat looks exactly like gloss varnish – but is, of course, far easier to maintain.

The yacht has pocket booms for easy sail handling, reefing and stowing. Pocket booms are a good solution for sails which use very long or full-length battens; the sail can be stowed simply and securely within the boom.

Both booms have internal reefing systems and outhaul jammers. Internal block and tackle systems for rope vang exit through slots. Putting equipment inside the booms, infeasible with wood, helps maintain *SummerWind*'s lovely historic appearance.



Top: Up close, can you tell what is wood?
Bottom: Vang exits through slot in boom.



Top: Silicon wafer mounted on GMT pallet.
Bottom: KLA WaferSight 2 interferometer.

Measuring silicon to .0002" isn't for amateurs

Silicon wafers are the semiconductor heart of computers and other electronic equipment. Measuring them is a critical task for IC companies and wafer makers and requires extraordinary precision. KLA-Tencor, with whom GMT has had a long association, builds machines which measure parameters such as thickness, shape and flatness.

KLA's WaferSight 2 is a dual-sided interferometer for measur-

ing nanotopography and edge of wafer roll-off metrology. GMT pallets carry 12-inch silicon wafers through the machine's scanner. Only a pallet made from aerospace-grade high-modulus carbon is up to the challenge: vibration or distortion would render the measurements useless. Our pallets are lightweight for rapid acceleration and higher production rates. Our pallets are stiff: there's no deflection when

loaded. This stiffness and lighter weight than aluminum or steel eliminate jitter and vibration.

Our specific ply-orientation determines the angle for over 120 carbon plies in each pallet. In places tolerances are within 0.0002" – 20 times thinner than a human hair.

Those with a truly scientific interest can find out more at www.kla-tencor.com/substrate/wafersight2.html.

Big sloop features a BIG rudder



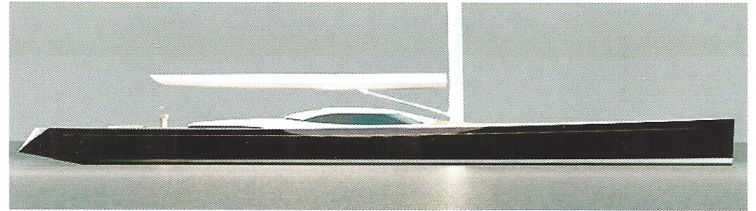
It's unfair to ask David to lift the bigger one.

In the photo at left, the smaller rudder is for a Frers 44, not a small boat. Compare that to the carbon rudder on the right, shown before delivery to Vitters Shipyard in the Netherlands. It's for the 147 ft (44.7 meter) *Lady B*, a flush-deck yacht designed by Dubois Naval Architects.

Sailing performance is key, and the aluminum-hulled *Lady B* has a high-aspect rig, a lifting keel with 4-6 meter (14-20 ft) draft and 240 tonnes displacement. The stresses on her rudder appendage will be so large they can only be handled efficiently with carbon fiber composites.

GMT worked successfully with Dubois and Vitters on previous superyachts, and they returned to us for *Lady B's* rudder. It's 6.1 meters (20 ft) in height, has a chord width of 1.4 meters (4 ft 6 inches), yet including the carbon stock it weighs only 421 kg (926 pounds). An equivalent steel rudder would be five times heavier.

David Schwartz, shown in the left photo, said, "*Lady B* has a design speed of over 20 knots, subjecting its rudder to extreme loads. This remarkable rudder will be part of a remarkable yacht, one of several magnificent boats for which we've built GMT rudders in association with Vitters and Dubois."

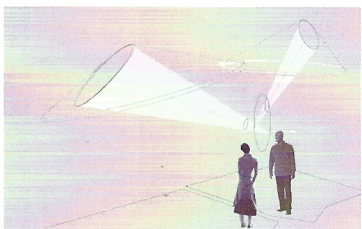


Designed by Dubois and built by Vitters, not every 147-footer has the wow-factor of the *Lady B*!

Office dA cooks up cool eatery; diners flock to curvy carbon loo

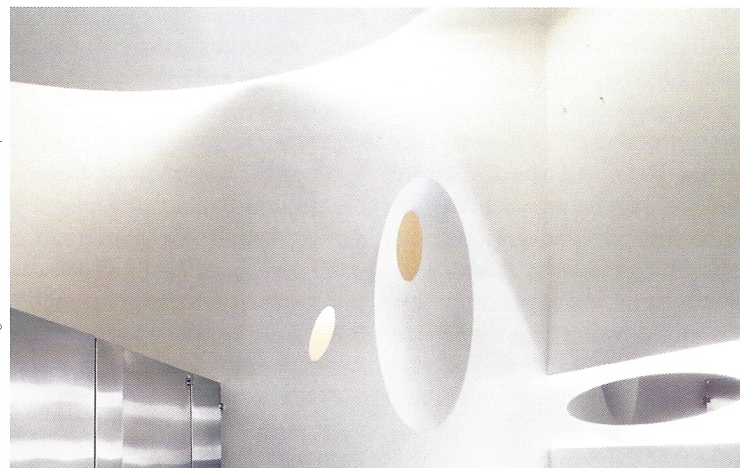


photo: John Horner



drawing: Office dA

Apertures offer a peek into each restroom.



An intricate interplay of ovals, illuminated by fixtures hidden in ceiling edges.

photo: John Horner

At BanQ, a French/Asian fusion restaurant in Boston designed by Office dA (officeda.com), undulating wood fins give a unique character to the dining area. The interior has received numerous architectural awards.

In the restrooms GMT carbon fiber ceilings provide an unusual spatial effect; their curved shapes would have been nearly impossible to build with conventional materials. And carbon composites meet the most stringent fire codes, even the FAA's codes for aircraft interiors.



Lightweight high-strength masts, booms, poles, struts, and composite structures for marine and industrial applications.

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Jay Kiley joins GMT Composites



Jay Kiley, new GMT Director of Sales and Marketing (left), and David Schwartz (right).

David Schwartz, President of GMT Composites, announced on May 1 the appointment of Jay Kiley as the company's new Director of Sales and Marketing. Kiley comes to GMT after

seven years selling superyacht rigging for vessels from 75 to 200 feet throughout the world.

Jay has spent his entire career in the marine industry. Prior to his appointment at GMT, he

worked with both Global BSI Rigging Service, Inc., and OYS Service, and earlier managed marine finance divisions for John Deere Credit and Key Bank on a regional and national level.

A past director of the National Marine Bankers Association, Jay is an avid yacht racer whose crewing resumé includes such events as the St. Barth's and Newport Buckets, Superyacht Cups, and the Shipyard Cup in Maine. A graduate of the University of Notre Dame, he is married with two children, one of whom is currently completing her first trans-Atlantic crossing under sail.