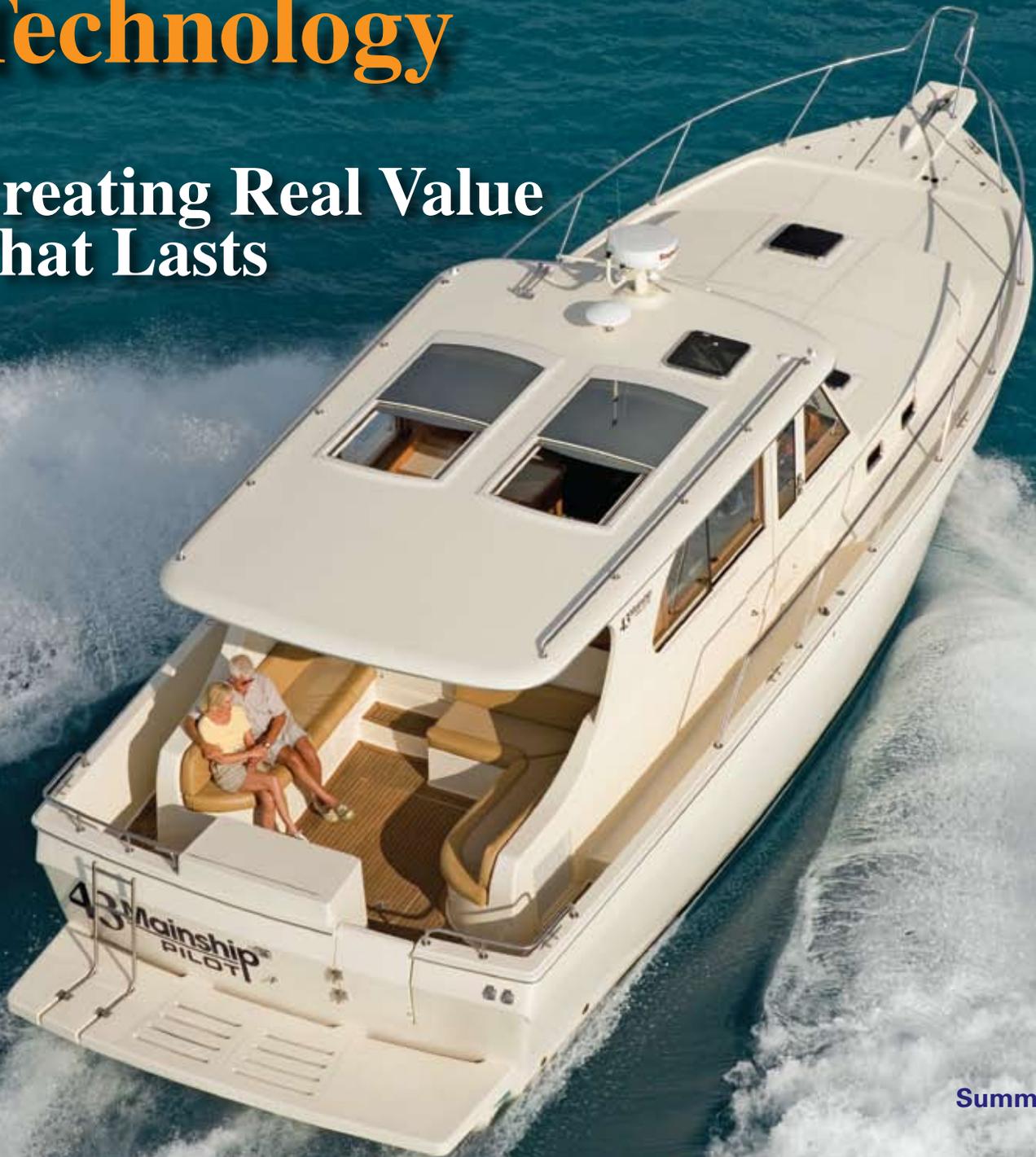


BOAT BUILDER PROFILE

MAINSHIP: A Leader In Technology

Creating Real Value
That Lasts



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Mainship - A Focus on Manufacturing Technologies and Processes

by Captain Mark J. Kellum

Mainship has an exceptional reputation for building a boat that retains value year after year. Even the earliest Mainship 34 Trawlers are still highly coveted. I wanted to see what made these boats so popular and in the process I discovered that it is not just what you see – the nice cabinets, beautiful decks, top-shelf components and shiny gel coats – it is what is *built* into a Mainship that creates lasting value.

I arranged with my local Mainship dealer to visit to the Mainship plant and take a tour. The Mainship plant in St. Augustine, Florida rests on a bend in the San Sebastian River, a short distance away from the Intercoastal Waterway. An appropriate location since so many Mainship models traverse these fertile cruising grounds from Maine to Texas.

Manufacturing Technology is the Key

Over the years I have toured dozens of boat building facilities. From the outside, Mainship's manufacturing buildings seem unremarkable. It is what is inside that is awesome. Mainship has invested heavily in proven modern manufacturing technologies and techniques throughout the entire process. "Mainship chose to invest in technology instead of manpower to achieve superior fit and finish quality," explained Jim Krueger, Mainship's vice president.

State Of The Art Manufacturing - An Exacting Science

Every Mainship is designed through advanced CAD/CAM program modeling. The program allows the designers and engineers to test the hull in trawler, pilot, and pilot sedan configurations along with various engine horsepower ratings, gear ratios and prop selections. The simulation program not only provides performance data, but also shows how much pressure is being exerted on every square inch of the hull. From this data, the fiberglass lay-up schedule and stringer set-up is developed. The model then can be tested via simulation in different sea conditions with different power plants. *Everything* is calculated right down to how much fiberglass is placed and how it is positioned. Once a model is thoroughly tested and approved, construction drawings and CAD/CAM programs for CNC machines are generated along with manufacturing schedules and the construction process.

The quality of any mold is determined by the accuracy and quality of the originating plug. Many manufacturers have the plugs for their hull and fiberglass components created by special plug makers. Mainship, however, retains control of the quality of its plugs by manufacturing them on huge 5-axis CNC routers that are programmed directly from the engineering model. These machines allow tolerances that were unheard of in boat manufacturing just a few years ago. This allows Mainship to create molds of superior quality.



Highly sophisticated Five-Axis Router creating the plug for a deck mold.

CNC controlled router creating the plug for fiberglass hull component.





CNC laser accurately cuts roving for the hull sides.

Everything from the gunwale to the keel, and all the fiberglass components, are perfectly formed to exacting tolerances. This reduces the amount of labor required when fitting components together, plus improves the form and function of the component.

“Mainship chose to invest in technology ... to achieve superior fit and finish quality”

Many manufacturers use the technique of pre-cutting the fiberglass cloth used in the lamination process and creating kits for the hull and fiberglass components. Mainship’s engineering model, however, generates programs for laser CNC cutters. What used to take hours of labor is achieved more accurately and in mere minutes. Mainship uses high-end blister and fade resistant gelcoats custom blended for strength, with impact

resistant low-styrene resins that are environmentally friendly in the manufacturing process. Computer-controlled resin spray-guns make sure the proper chemistry and consistency is achieved when applied. Perfect overlays and correct densities of fiberglass is assured, creating stronger hulls with higher quality than ever before possible.

I was also impressed to see that Mainship uses only the finest coring materials such as end-grain balsa to strengthen the hull walls. No coring is used below the waterline to protect from water intrusion that could result in de-lamination.

Fiberglass components that need to be finished on both sides (such as hatches) traditionally needed to be assembled from two sub-components that are each finished on a single side. Mainship employs Resin Transfer Molding (RTM) techniques that allows fiberglass components to be finished on both sides. This process reduces the cost and time associated with fitting sub-components, while increasing overall component strength and improving the finished appearance.



Our tour guide, Engineering Manager Stephan Vitas, with a RTM mold injection system.



Smart Building - From Interiors To Processes

Mainship recognizes that a lot of what people want in a trawler style yacht is the richness and warmth of a wood interior. Mainship interiors maintain the beauty of wood with excellent fit and finish attained through the extensive use of proven high-tech manufacturing processes.

All Mainship interiors are state-of-the-art modular designs. The wood components are cut from a CNC router fed from the computer model generated by engineering. This approach maximizes the consistency of the fit and finish of these component parts. Fit tolerances are very “tight” and based on my observations, the result is among the highest quality in the industry.

For the assembly of the precision-cut wood joiner bulkheads, flats and ceiling paneling, Mainship craftsmen utilize a flat panel assembly table that has pneumatic hold-downs. This allows for quick and precise alignment of screw-holes that have been accurately pre-drilled on CNC machines. The resulting component has a fit that is virtually seamless.

Cabinet doors and other components that require laminate edging go through a computer-controlled edge-bander that applies the laminate with extreme accuracy.



The computer-controlled cutter cuts panels with tremendous accuracy for tight fit-ups.



The computer-controlled edger provides a quality finish for the cabinet door.



These wood component parts are assembled into kits and the entire interior is assembled outside that hull structure. This allows craftsmen to work from both the inside and the hull side of the interior. There are several advantages to this operation. Components and entire systems can be assembled and tested much more easily. Strengthening members and processes can be applied to the outside of the structure, delivering unprecedented strength and sound reduction. Pre-assembled cable harnesses can be run more quickly and accurately.

The cable harnesses are assembled on jigs and use connectors that are unique to the particular connection. This eliminates mistakes that may occur if the various harnesses had the same connectors. The harness are all labeled and thoroughly tested before being assembled into the interior module.



The optional Ever-Wear® flooring is a very attractive addition to the interior of the salon. Like the name implies, this surface is as durable and easy to maintain as it is beautiful.

“... we do not adopt anything into the actual manufacturing process until we have established a proven track record ...”

The assembly table allows the fitter to maintain the tolerances set by the CNC machines.



My guide for the tour was Stephan Vitas, engineering manager for Mainship. When discussing technology issues with Stephan, he wanted to make it abundantly clear that Mainship does not just adopt any technological process. “Mainship Corporation is continuously researching and testing new materials and technologies, but we do not adopt anything into the actual manufacturing process until we have established a proven track record of a potential new material or process from Research & Development. This sometimes takes many months of detailed testing or simply exposing materials to the natural elements for a prolonged period of time. Until then, we continue to build our

An interior assembly module ready to be placed in the hull.



Cable harnesses are well laid out for easy access.



boats with the long proven materials and technologies that have rewarded us with the well known product reputation for quality and reliability.”

Other areas of Mainship manufacturing technologies that I would be remiss in not mentioning include, vacuum form molded finish components that attractively cover cable junctions or anything that would improve quality or safety by being covered. High quality ASTM AISI stainless steel is the product of choice and will not corrode and rust like lesser grades of stainless steel on fasteners, safety rails and other component parts.

Mainship also offers the top-of-the-industry IMTRA Side Power® bow thrusters. These proven thrusters make docking and maneuvering tight spaces a breeze.

“Mainship is an employee-owned company and all-levels of employment are stake-holders in ensuring that our products and reputation are of the highest standards,” said Krueger. “Management enables and encourages employees to identify technologies, products and processes that will improve quality, performance and/or reduce costs to the consumer, and we feel a real sense of pride of ownership among the Mainship family.”

My visit to the Mainship plant reminded me of an old quote by Henry Ford. “Quality means doing it right when no one is looking.” It seems to me Mainship has been doing it right even when we weren’t looking. My advice, if you are in the market for a beautifully designed, high-quality, well-built, trawler, keep an eye on Mainship.

MAINSHIP’S KEY MANUFACTURING ADVANTAGES



- Advanced CAD/CAM modeling and testing
- Precise CNC machines and tooling
- Quality gelcoats and resins
- Resin Transfer Molding (RTM) technology
- High quality fit and finish
- Modularly design and built interiors
- Select laminates and flooring that are durable and easily maintained
- Cable harnesses with harness specific connectors
- Superior components and systems
- Continuous and dedicated research and development of new technologies and processes
- Employee ownership

Captain Mark J. Kellum is a former boating columnist for a major metropolitan newspaper and now writes as a freelance journalist.

