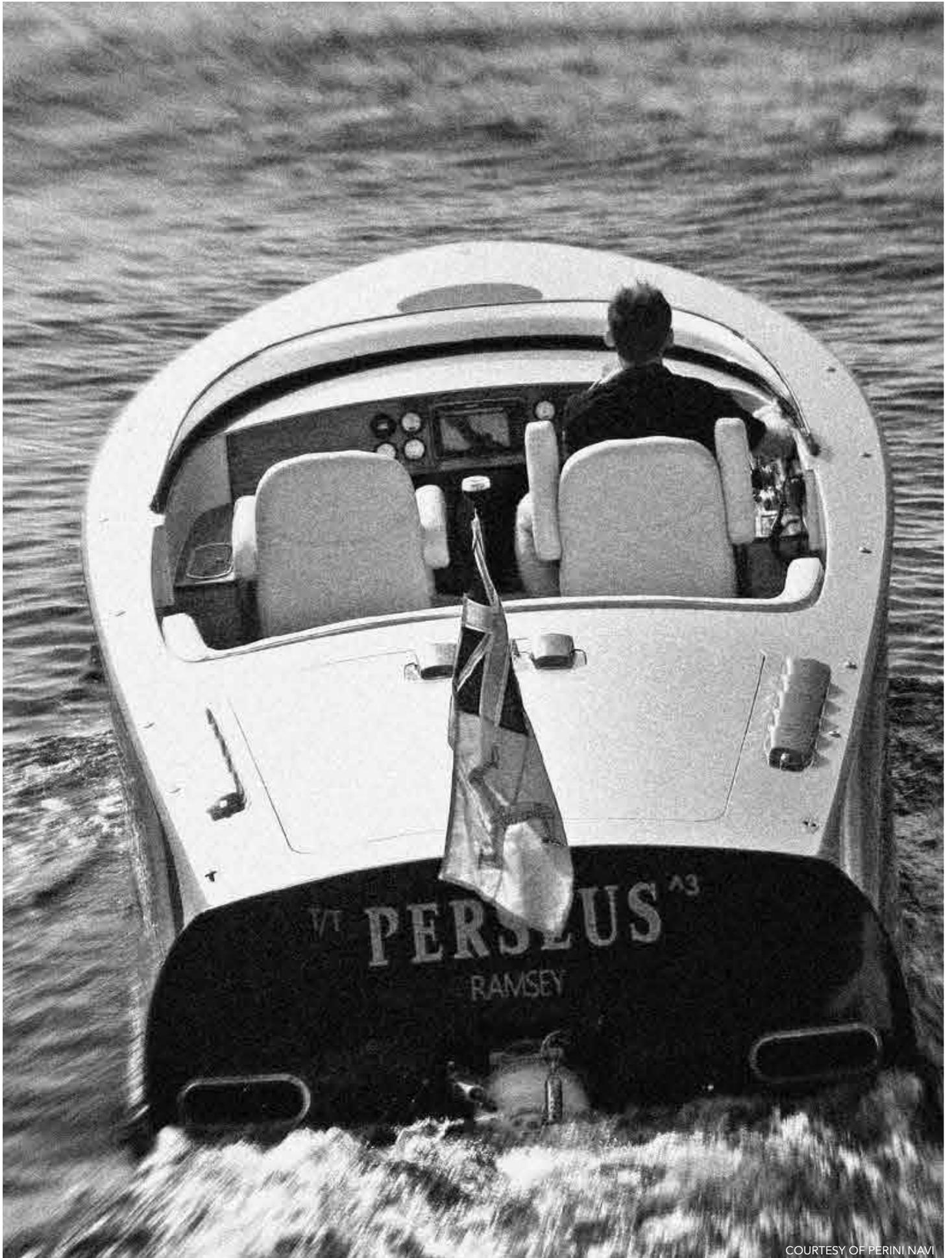


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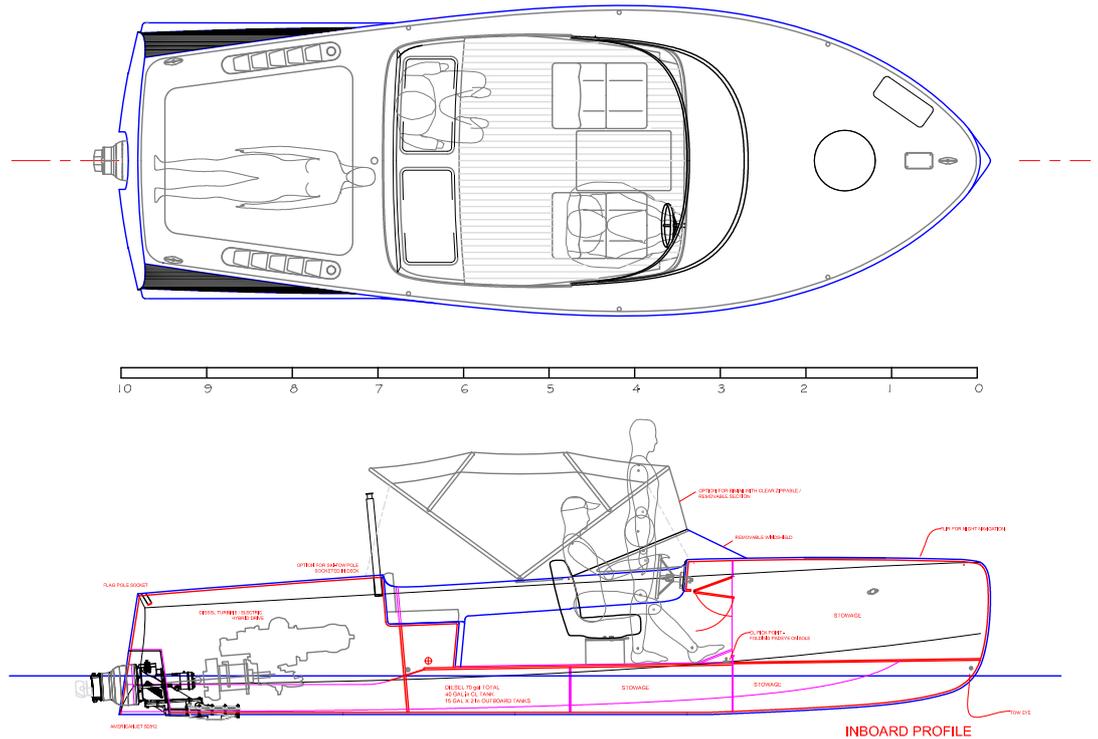
T/T PERSEUS³

A WOLF IN SHEEP'S CLOTHING

Custom tenders come in all shapes and sizes. But there is nothing on the water quite like the fast runabout by Rodger Martin Design and Constellation Custom Tenders in the US for *Perseus³*, the 60m sloop launched last year by Perini Navi.



COURTESY OF PERINI NAVI



On the outside, the RM 169R is an elegant 6.45m fast runabout with distinctly retro styling. Beneath her classic exterior, however, it is a wolf in sheep's clothing. Squeezed into the engine bay is a hybrid turbine-electric powertrain coupled to water jets that can produce a top speed of more than 50 knots or low-speed, silent power for pootling around the marina. No Riva or Chris Craft could ever do that.

"The owner is a very hands-on sort of person who pilots his own plane," says Niall Rafferty, a former captain who came ashore in 2008 and set up Custom Yacht Outfitters in Rhode Island, US. "He was looking for something beyond your average RIB that would reflect the high-performance nature of his sailing yacht."

Rafferty approached Rodger Martin Design (RMD), a Rhode Island neighbour, after having seen a pencil sketch of a classic barrel-backed runabout penned nearly nine years ago and pinned to the wall in the office of Ross Weene, an engineer and partner in RMD. Constellation Custom Tenders was born. A design proposal was presented for two tenders: the RM 169R limo (the 'R' stands for runabout), and the RM 169U (the 'U' stands for utility) based on the same hull form that serves as an MCA rescue boat with wheelchair access for ferrying up to 12 guests.

"The hull dimensions were restricted by the foredeck tender bays, which were already built," says company founder Rodger Martin, who once worked as chief



designer for Derektor. "There are just millimetres to spare and the crew have to disconnect the water jet buckets and, in the case of the runabout, remove the windshield."

Weight was another factor that had to be taken into account. The maximum weight allowance provided by Perini Navi was 1,500kg to be MCA compliant, the tenders have to be launched and retrieved with the crane's safe working load capacity of 1,800kg. This consideration alone pointed at carbon fibre construction for optimum strength-to-weight ratio. Drawing on his experience in offshore race programs, Rafferty also devised below-deck antennas that transmit and receive through the carbon structure as in the Volvo race boats, and pop-up FLIR cameras in the forepeak.

Following the naval architecture and hydrostatic studies, RMD developed a surface model for mouldCAM in Bristol, Rhode Island, to prepare the CNC-milled

hull and deck moulds. These were built just over a metre longer to requirements to allow for marketing a 7.7m barrel-back version of the tender. The foam-cored, prepreg carbon hulls, with final engineering by SDK Systems, were vacuumed and cured in an oven built above the moulds. Originally, both tenders were to be powered by the same 260hp diesels, but discussions with the owner soon led to a very different drive train for the runabout version.

"The owner has a turbine generator as a back-up for his home and thanks to his interest in aviation is familiar with the technology," explains Rafferty. "But because the turbine is pretty loud when it's winding up, we also thought it would be cool to have an electric motor for silent manoeuvring in port."

The next challenge was how to integrate the gas turbine and electric motor systems to create a reliable and safe hybrid propulsion package. As this has never been done before on a boat, Rafferty turned to



COURTESY OF PERINI NAVI

Delta Motorsport, based near Silverstone in the UK. Set up by managing director Simon Dowson and technical director Nick Carpenter, the company offers a full range of vehicle design services and specialises in high-performance, lightweight structures and electric or hybrid powertrains. The company is currently part of the team working to develop hybrid versions of Land Rover's Range Rover Evoque.

"Our initial brief was to design the lithium battery banks, but that quickly grew into overseeing the whole system integration," says Carpenter. "We had previously developed a battery pack for a subsea drilling operation, but the tender project was much more up our street as it gave us more opportunity to understand the final application and provide added value by drawing on our experience in the automotive field."

Delta Motorsport received the limo runabout after her water jets, electric motor and Detroit Diesel turbine had already been installed. Unlike hybrid cars, where the focus is on CO₂ emissions and maximising range, the tender was designed for high-speed transfers under turbine power and up to one hour's autonomy at low speeds using the in-line electric motor. It also works in reverse as a generator to charge the batteries when the turbine is engaged. Beyond developing the 48-volt

battery pack, much of the work in the UK focused on the power management system that would allow switching between turbine and electric modes in a safe and user-friendly fashion.

According to her designer and builder, the final result is the world's lightest and fastest hybrid tender. In sea trials on a lake in Florida, the runabout achieved speeds in excess of 65 knots, but a limiter reduces the top speed to 55 knots for safety reasons. In electric mode, the boat also performed according to expectations with a range of one hour at 10 knots. The utility tender, powered by 260hp Yanmar engines, is no slowcoach either and, following adjustments to the pitch of the water jets, reached 40 knots.

"There was a lot of pressure to get it right," says Martin of his first tender design. "Due credit should go to Ross Weene, who developed the concept and is a very good left and right brain engineer. The boats have performed flawlessly and provide a very good ride for such light structures."

Constellation Custom Tenders now hope to market similar designs using the same hull moulds. Naval architect Rob Doyle, whose first job out of university was for Rodger Martin and, like Niall Rafferty, hails from County Cork in Ireland, was also brought into the project following a request from the owner of *Sybaris*, the 70m Perini

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Navi in build, for a variation of the design with different aesthetics. That commission fell through, but Doyle has developed designs for a 10m and a 13m owner's tender in conjunction with Constellation Custom Tenders.

"At the Monaco Yacht Show, all the tender manufacturers came aboard *Perseus*³ to try to find out more about the hybrid system," says Doyle. "Having the option of electric power makes perfect sense on superyacht tenders when they're docking or in port. It's not about range or speed, but silence." ■