SUPERYACHT DESIGN

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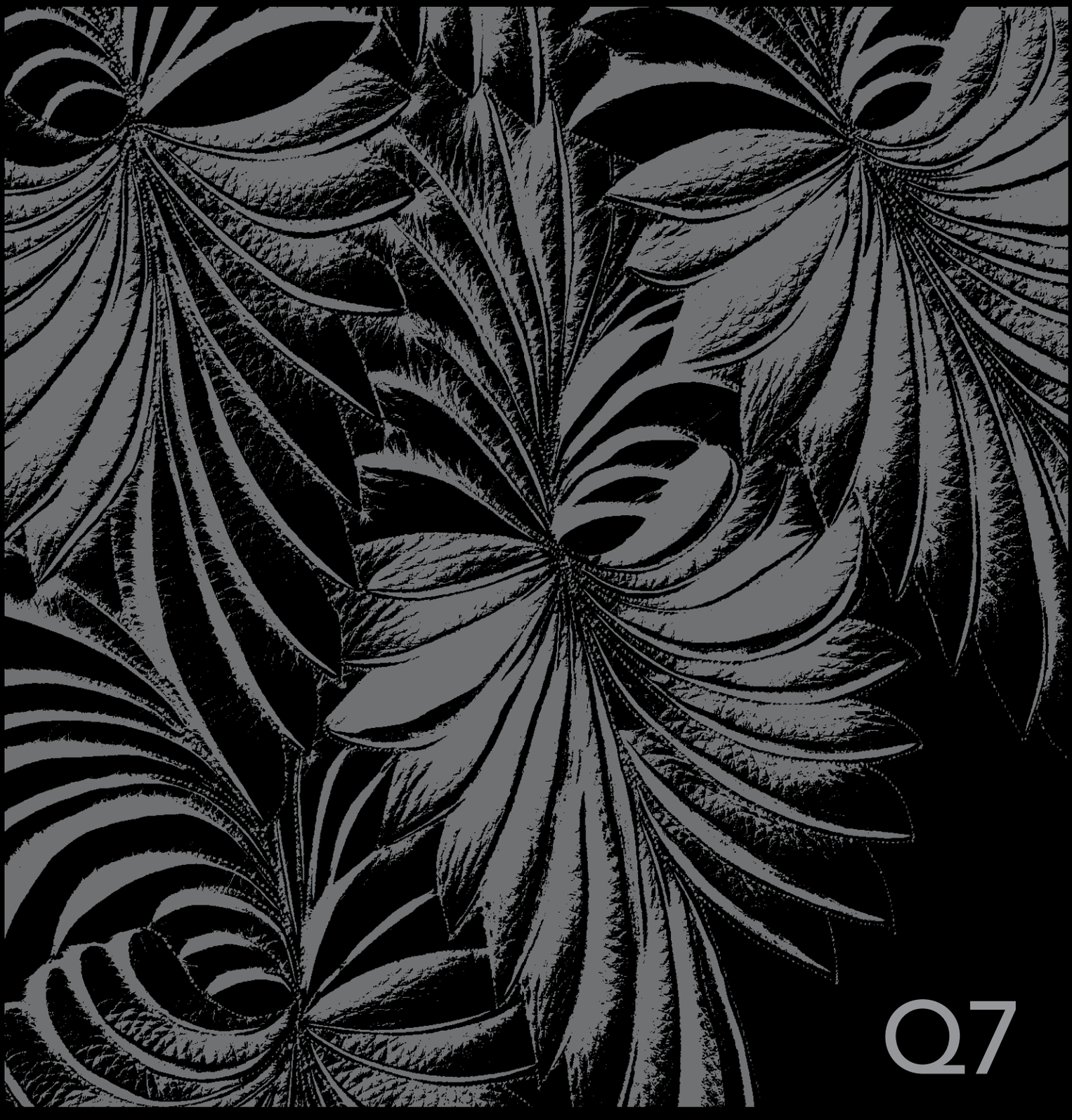


Q7

GUEST SUITE

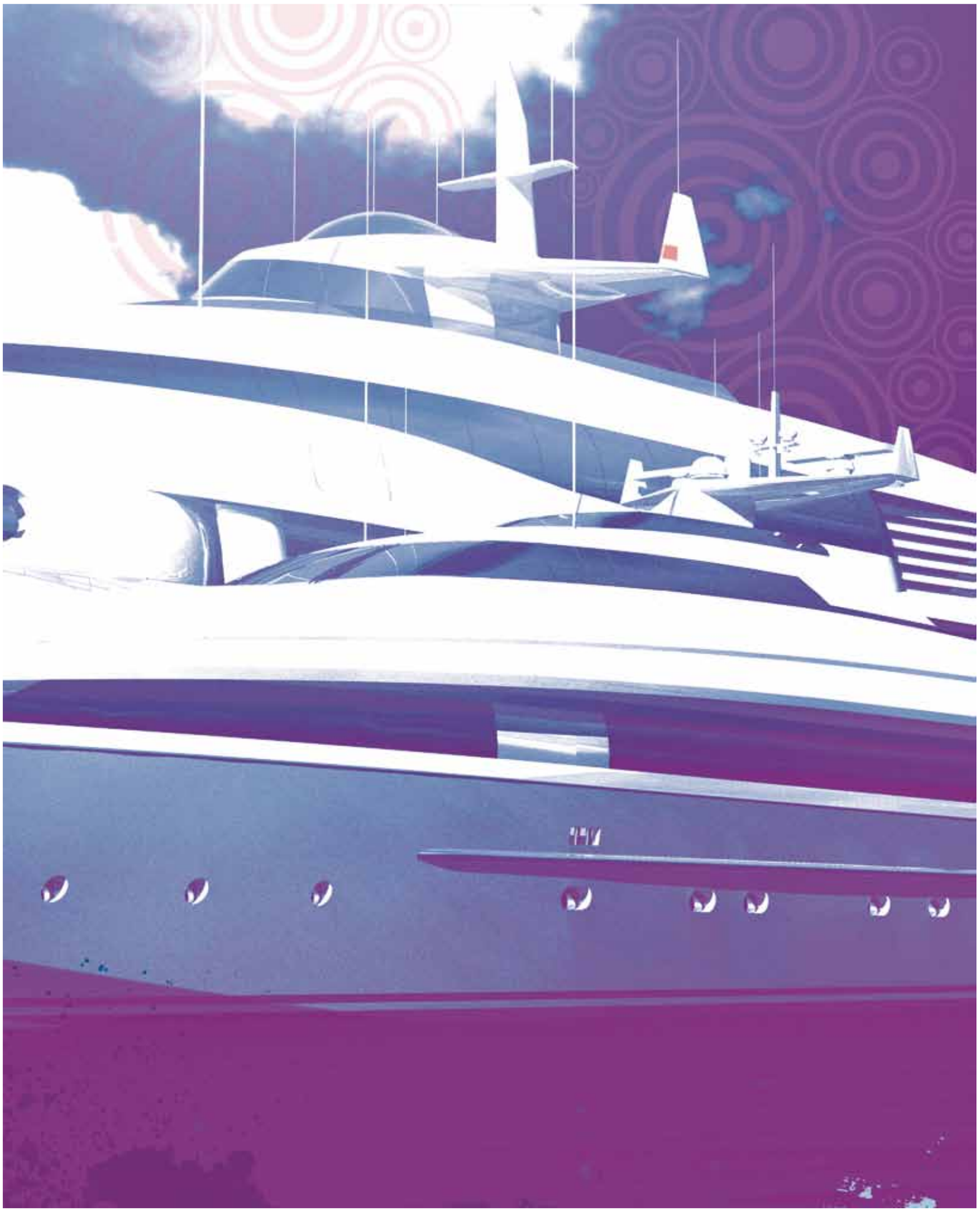
Ian Hornsby
TECHMAN

Gary Grant
GARY GRANT DESIGN

Peter Symonds
SIGMUND YACHT DESIGN

Adam Lay
ADAM LAY STUDIO

Four guest commentators present frank yet considered opinions on design-related topics of their own choice.



GARY GRANT / JAMES TREDRAY

MAST-ERLY METHODS GARY GRANT

The creative integration of electronic hardware and new materials into the design of the mast of a vessel, along with the use of aerodynamic forms, is a recognised signature element of Gary Grant Design (GGD), whose latest project is a 50-metre motoryacht for Heesen. "The visual clutter of the antenna farm on many of today's luxury motoryachts often distracts from their character and stance," notes Gary Grant. "We seek out and are alert to the opportunities that advanced technologies, including composite materials, can provide."

Phase array satellite antenna technology will soon replace the quintessential dome-covered dish and what is now perceived as a prestigious mushroom collection, will appear outdated, if not obsolete. It is important to note that satellite antennas available today can receive and transmit in high definition with a unit that is no more than five inches or less than 13cm thick, which makes the physical unit virtually invisible to the viewer when recessed flush into the deck. The antenna automatically acquires and tracks the desired satellite using open-loop and closed-loop tracking algorithms, interfaces to the user's modem installed in the vessel and provides continuous broadband connectivity (voice, video and data) while underway without antenna-deployment delays.

"The antenna performs on high-earth orbit satellites in the KU band, which are located 27,000 miles high," explains Paul Pazzaglini of P&L International, which last year announced its ZipPhaser II, a breakthrough maritime satellite communications system for high-speed Internet broadband that maximises the efficiency of satellite capacity support for small-profile antennas. "The orbit is fixed over each geography and the range of one satellite can cover one quarter of the earth. The number of high-earth orbit satellites operating in the KU band today exceeds 400 satellites with total earth coverage. To have true global coverage and seamless antenna integration with coverage around the world, whether it be on land or water, takes a combination of phase array technology and automatic beam switching. The aerospace engineers work as a team in developing technology that will work in 30 years' time and they have to be prepared for future enhancements on the ground, which means that systems on the ground will eventually catch up with what has been launched into space."

New materials also mean designers can simplify the mast form and eliminate the clutter. The X and S band radars, for example, can be placed inside the mast wing and support. This is what we did when designing, engineering and building 41.5-metre Adler II our signature design built by Vectorworks back in 2005. The latest quartz glass and resin composite technology, coupled with precision tooling, allowed the fabrication of microwave-transparent mast elements. Crucially, that means no mast shadow issues for radar or sitcom antennae.

Another and much appreciated benefit of building and designing in composites is the opportunity to optimise the structure by varying the skin strength and thickness to keep it in line with structural analysis requirements. The structural weight savings, combined with those of using a phase array system in place of a dish, can amount to over 65 per cent—a significant reduction, especially on faster planning yachts.

By using advanced composites, the designer can find more exotic and fluid solutions that may include aerodynamic and cantilevered forms. Should the shipyard require an alloy or steel primary structure, complex forms that may require transparency can be mechanically and chemically bonded with high-strength adhesives specifically designed for dissimilar materials. This means the mast elements can be seamlessly integrated into the form of the vessel without undue complexity or adornment. When carefully planned and executed, the results are elegant and unpretentious.

Mast wings, support and appendage geometries are best created using precise NACA low-speed air foil sections. This provides a high degree of integrity to the overall design of the vessel and reduces air flow resistance, noise and, in some instances, can improve the comfort levels in open areas such as sun decks when the vessel is underway by managing air flow to avoid exhaust fumes. It is easy to see how the development and understanding of airflow dynamics has impacted aircraft, automotive and high-speed rail design. There is no reason why the same insights cannot benefit the superyacht industry. Anyone who has been on the open deck of a vessel travelling at even modest cruising speeds will understand that in many cases aerodynamic solutions in the design stage are worthy of consideration.

As with any new product design, there is always room for unique and unusual features when they are tempered with purpose and function that will give the final design a longer life and result in a vessel that is easy on the eye. That said, it is paramount that creature comforts are not driven by the exterior envelope. The ultimate reward for the designer is the process by which we find a balance between art, science, comfort and functionality in a simple and elegant form—a difficult task, but well worth the effort.

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