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Volume 33 • Number 6

Marine News

JUNE 2022

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Combat & Patrol Craft Annual

Updates, Developments and Advances

Propulsion Systems
Weighing the Options

Communications
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Johan Inden
Interview with Volvo Penta's Marine Unit President

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Michael Macdonald / U.S. Navy

David Clark Company

On the Cover

A boat crew from Coast Guard Station Shinnecock conducts training aboard a 25-foot response boat near Shinnecock Bay, N.Y.

(Photo: Gina Ruoti / U.S. Coast Guard)

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Editor's Note

Eric Haun, Editor,
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There's no shortage of threats lurking in the maritime domain, whether far out at sea, or closer to home, along our shores, at ports and in inland waterways. In an effort to counter these threats, federal and local agencies are constantly investing in new combat and patrol craft—often with the latest and greatest technologies on board. This month, Don Gale writes on some of the recent updates, developments and advancements in this space, with a particular focus on build programs for the U.S. Navy and U.S. Coast Guard. The story begins on page 22.

A vital component of any patrol vessel is its propulsion system, but selecting the right solution for the job at hand requires much consideration. Jeffrey Bowles, director of DLBA Naval Architects, delivers keen insight on keys to consider when making the important choice between system types. The piece comparing characteristics of propellers, waterjets, sterndrives and outboards starts on page 18.

Another crucial part of the equation for anyone working on government or commercial vessels is communications, and technology in this area is evolving rapidly, especially as the effects of digitalization continue to creep into the picture. Tom Ewing explores this topic in a feature starting on page 22.

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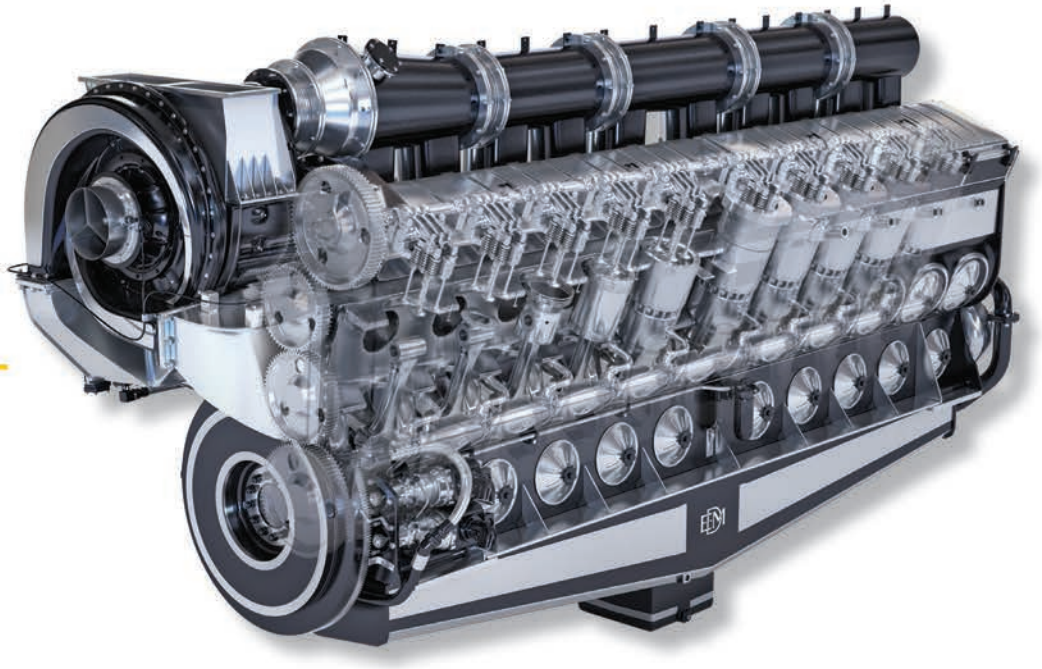

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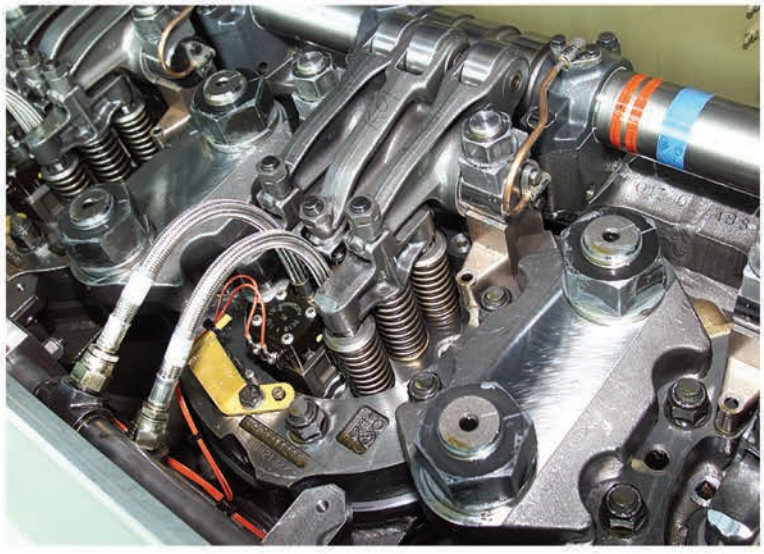

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By the Numbers

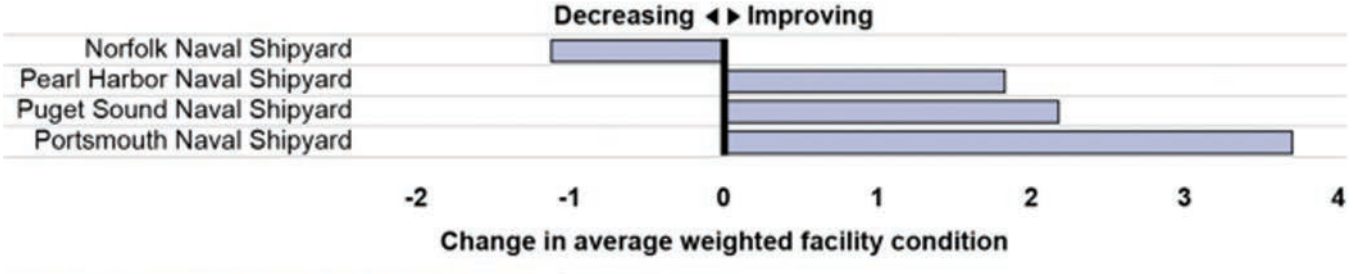
Shayne Hensley / U.S. Navy

Improving US Naval Shipyard Infrastructure

In 2017, the U.S. Government Accountability Office (GAO) reported that the poor condition of the U.S. Navy's shipyard infrastructure—including dry docks, facilities and capital equipment—was preventing the yards from fully meeting the service's operational needs. The congressional watchdog found that inadequate facilities and equipment was leading to maintenance delays, which contributed in part to thousands of lost operational days—days when ships were unavailable for operations—across the Navy's submarine and aircraft carrier fleets. Further, the shipyards would not be able to support almost a third of planned depot maintenance periods for the current fleet of aircraft carriers and submarines over the next two decades, according to the GAO report.

In response, the Navy in recent years has taken action to improve its public shipyards. In 2018 it began a 20-year, $21 billion effort to modernize and optimize its shipyards, known as the Shipyard Infrastructure Optimization Plan (SIOP). The Navy has also implemented several GAO recommendations, such as creating a program office to manage the SIOP, instituting regular reporting internally to the Navy and externally to Congress and improving its performance metrics for tracking maintenance delays to better capture infrastructure issues, among others. It has also invested in shipyard infrastructure well above the minimum level set by Congress.

These are steps in the right direction, certainly. But has there been any progress? In another report published in May 2022, GAO found that the average condition of facilities at Navy shipyards has improved at three of the four shipyards from 2016 to 2020.



Source: GAO analysis of service facility condition data. | GAO-22-105993

Average Age of Depot Capital Equipment by Service, as of Fiscal Year 2020

	Average Age of Capital Equipment (in years)	Capital Equipment Beyond Expected Service Life (percentage)
Naval Shipyards	23.6	57
Norfolk Naval Shipyard	12.5	63
Portsmouth Naval Shipyard	13.6	41
Puget Sound Naval Shipyard	35.6	65
Pearl Harbor Naval Shipyard	9.4	39

Source: GAO analysis of military service information | GAO-22-105993

However, GAO found the Navy faces a number of remaining challenges to improving the infrastructure at the shipyards.

For one, the backlog of facility restoration and modernization projects—those intended to restore, renovate or replace buildings or components—has increased by over $1.6 billion in the last 5 years.

In addition, the average age of capital equipment has continued to increase, and more than half the equipment at the shipyards is past its expected service life. The Navy estimates modernizing this equipment could cost $3 billion.

Meanwhile, the cost of dry dock projects has doubled and may grow further. In 2018, the Navy estimated that it would need $4 billion to modernize its 17 dry docks. However, the Navy reports that the cost of just the first three dry dock projects has grown by over $4 billion. This is on top of costs not included in the initial SIOP estimate—such as inflation, utilities, environmental remediation and historical preservation—which could add billions.

And initial SIOP schedule goals have slipped. Detailed shipyard investment plans—known as Area Development Plans (ADP)—will not be complete until fiscal year 2025, three years later than planned. In a 2021 report to Congress, the Navy stated it would complete the ADPs by fiscal year 2021. But in a September 2021 update of that report, the Navy stated the ADPs would be complete four years later, in fiscal year 2025, due to financial constraints. Yet Navy officials insist the new timeframes will not affect the completion of key projects, such as the dry dock. But the GAO said delays may slow construction of other facilities, ultimately resulting in a reduction in the Navy's ability to perform its mission.

According to the GAO, completely implementing the SIOP will involve funding well above the levels allocated in recent years for shipyard infrastructure; as well as significant planning and sustained management attention over 20 years. In the SIOP's 2018 release, the program estimated a cost of about $1 billion per year until its completion. While the SIOP does not project yearly funding requirements, GAO reported in 2022 that the Navy's facility investment has been under that level every year since 2007, although the Navy's investment levels have climbed since it published the SIOP. GAO found that funding the original SIOP would equate to an increase of more than 40% over the next five years when compared to the Navy's average over the previous five years. Any cost growth would further increase that gap.

Addressing the remaining GAO recommendations could assist the Navy in reaching its goals of improved shipyard capacity and performance, the agency said. For example, developing accurate cost estimates will help the Navy articulate its resource needs to fully implement the SIOP. This includes optimizing facilities and replacing aged equipment in addition to the dry dock improvements already underway.

The congressional watchdog said it will continue to monitor and assess this multi-year effort, including the Navy's cost and schedule estimates for the SIOP.

Johan Inden

President of the Volvo Penta Marine Business Unit

Johan Inden *heads Volvo Penta's global marine business unit as part of the company's executive management team. "I have global strategy responsibility, global product responsibility, direct commercial responsibility for everything except North America; we have our own commercial setup with our local president there, Fredrik Högberg. Of course, we collaborate very closely, but we have in our DNA to be very close to customers, so we think we need a dedicated commercial organization in North America as well," Inden said.*

A civil engineer by training with financial degrees too, Inden has been with the Volvo Group for roughly 20 years, including the last eight years with Volvo Penta, the first four as CTO. Prior to joining Volvo Penta, he was the president of venture capital business Volvo Ventures, and is still very much focused on the "balance between technology and financing". "It's in my DNA to try to find how to accelerate development. How do we build an ecosystem between the small and the big, just to make everything go a bit faster or get better or move forward?" Inden said. "I still enjoy working with startup companies, looking at the new technologies, seeing how we can interact with them, how we can benefit from collaboration. I think collaboration is a very strong part of solving the challenges forward, building a better experience for the customer, doing the sustainability journey."

Marine News *caught up with Inden over breakfast in Svalbard (there's a story there; check in next month to read it) for a discussion on market drivers, the shifting sustainability landscape and Volvo Penta's role in all of the above.*

How does the North American market compare to others globally? What are some of the key differentiators that lead Volvo Penta to separate it from the global business?

JI: I would say that it's not so much the structural difference that makes us run it that way. It is to make sure that we have both from engineering to executive presence with customers. We'd like to have very broad and deep touch points with the different segments we operate with, with the OEMs, with the dealer structure. It's more a setup to make sure that we're close to the business rather than it being a different business. So, we have engineering capability, we have purchasing capability, we have production out of Lexington, and then we have a management team for North America as well. We want to make sure that we are representing the full business there. It's more to get close to the business, because when you're close to the business, you understand it, you can make the right decisions, you can support the customers in the right way.

Where do you see the greatest opportunities in North America today?

JI: We have a very strong historical position in the leisure marine market. Our stern drive's been very successful over time, but that market has changed a bit due to outboards. So, looking at the full marine business, the opportunities are for sure on the commercial side where we see that we are growing. We see some of the sectors, like wind farm service vessels, CTVs being one of the sectors, where we have really been able to get a footprint. We have pilot vessels where we've been successful with the IPS. If you would look to those type of drive cycles, you need speed, you need maneuverability, you need efficiency, you need fuel efficiency, and you have an idea of how you want to progress that technology forward. That's a good mix for us. Patrol, pilots, crew transfer vessels, passenger vessels, those are all sectors that we are monitoring closely.

But then, of course, we are in the tugs and the heavy equipment or heavy boats as well. And we do see a very strong opportunity on the genset side. Various speed gensets is becoming more and more of an opportunity when we see more serial or diesel electric solutions, when we start building this architecture of having electrically driven parts, you have a bank of gensets, you have a group of batteries, the type of setup that is pretty traditional in marine, in a sense, in bigger boats and in slower boats. What is interesting now is that it moves into high performance boats or boats that are run at higher speeds. That I think is the real opportunity for us as well.

How do you see the recent CARB harbor craft emissions rule changes in California, and how do they impact Volvo Penta?

JI: Being part of Volvo Group, we have a ton of experience in advanced emissions aftertreatment systems, because as we know, marine is kind of coming in a natural sequence behind the passenger cars. It's more or less always first out on the legislation, then you have commercial vehicles, then you have off-road vehicles, you have marine. We have already launched our IMO III solutions. We have advanced SCR solutions on the market today. And, of course, we see stage five solutions coming in Europe, et cetera. We are closely monitoring that. We have our development activities going. We're learning a lot from our commercial peers in the Volvo Group on the technology side on what can we reuse, how do we need to adapt it, and how is it fit for marine use? I think it's something that we will see just continuing. That evolution is very one directional. It will move forward, so we better get prepared. And I think we're pretty well set up for that.

Fully integrated helm-to-prop propulsion systems have been a hallmark for Volvo Penta through the years. How do you see this evolving into the future?

JI: It's been a strength on our side for a few different reasons. First of all, as a customer, as a builder, you get a one point of contact for a large part or the entire part of the drivetrain. It means that you have a natural interaction with us across the build process, and even more importantly, when there is something wrong, because there will always be a service need or something. We can never pretend that everything will never break. Things break. When they do, we need to fix it. So instead of having multiple points of contact and trying to figure out who's responsible for this challenge, we take the full responsibility. It's our job to sort out where from prop to helm the problem is, and our service system is set up to handle that. That's the first part.

The second part is that it gives opportunity to design the

experience in an even stronger way. Out joystick system, for example, you can't do that really without being able to tune all the parts in the prop to helm system, because it's a visual part of it. It's, of course, a steering and electronic part of it, but it's also a drive efficiency part of it, and it's how you engage the engine, et cetera. For us, that integrated system gives very strong responsibility and also an innovation platform. If I take that to the next step to hybrids or full electric systems, you will benefit even more from that, because then you have to be in full control of the entire driveline, and it will be even more of an integrated system with a new setup for your electronics, your power system, your power management, et cetera.

I think we bring a very strong DNA into that, and we're well set up to be able to handle the next level of integration. And, of course, in our vision forward, it is to continue expanding that integration platform. We own Humphree, for example, interceptors and fin systems. We have our first product on the market, the Volvo Penta BTS, an interceptor, which is integrated into the system. But, of course, you can imagine how we can continue together with Humphree doing total stabilization while also running efficiency while also doing hybridization, just as a natural analogy of how we're working.

Continuing on this path, you could soon be one step short of building the whole vessel.

JI: We will never build the boat. That's simple. But we will enable great boat building. That's how I see it. It's a very clear crossing of stepping into designing boats, building boats, et cetera. We'd like to be the pride of everything that goes in the boat, so to say.

How do you see the marine sustainability shift currently underway?

JI: I think we're in for a fantastic journey in the marine industry. I mean, we are very capable engineers in this business. From designers to operators, to yards, to propulsion suppliers, we're used to delivering different kind of solutions, different size engines for different types of operation. I think with what is happening forward, we both have a great opportunity to continue levering that knowledge. And I think that if I would make any call out to the industry, it's really let's always explore what's the next frontier, because we are very capable of getting that done.

And second, it is the responsibility to actually do that. We're part of moving an industry. We think we can all subscribe to the sustainability journey and recognizing it's not a binary shift. You don't go from unsustainable to 100% sustainable. And you can always find arguments why someone else is not moving. But instead, we have a responsibility to lean forward. If I can solve my part, then someone else will solve their part and then we get that move and we can change this industry quite quickly, I think.

Earlier you mentioned marine's parallel with the auto industry, and we can see how automotive is on track to maybe eventually remove gasoline engines from the picture. Do you think the marine diesel engine will always have a place in the industry?

JI: I think the marine journey is different from passenger cars where the use case and technology supports are almost like a one-track road toward electrification. At least that's how I perceive it without having deep insight. Marine requires much more of a portfolio approach. Some use cases are already today possible and are running full electric. Some need hybrids, at least for a while. We will need hybrid supported by gensets in the future where we need to look at different fuel options, so alternative fuels, green fuels. And the diesel engine will be, I think, the excellent platform for that, but it might run on HVO. It might run methanol. It might, in larger size ships, run ammonium. It might be hydrogen combustion, and eventually it might be a fuel cell powering it all.

In our charter forward, there is not a one-way road. We need to play with all these technologies. And here we're talking hybrids and we're talking batteries in the vessel, but are we doing as much to understand the alternative fuels option? I always pull up and say, "If you want to do something today, secure HVO and run with us." We have a few commercial operators, but one which I know very, very well in Sweden, they do seabed monitoring. They switched completely to HVO100. It's part of their brand, part of the way they market themselves, part of the way they operate their business. It's a huge step forward. You're seeing exactly the infrastructure they have in the boat, no tweaks to the engines, no new tanks needed, nothing but the access to the fuel. There are low threshold activities, and I think we need to remember that, that it's not a let's develop for 20 years and then wham, boom, it happens.

Column

Propulsion

Danny Gonzalez / U.S. Marine Corps

Propulsion Systems for Patrol Craft

By Jeffrey Bowles, PE, PMP, Director, DLBA Naval Architects, A Division of Gibbs & Cox, Inc., A Leidos Company

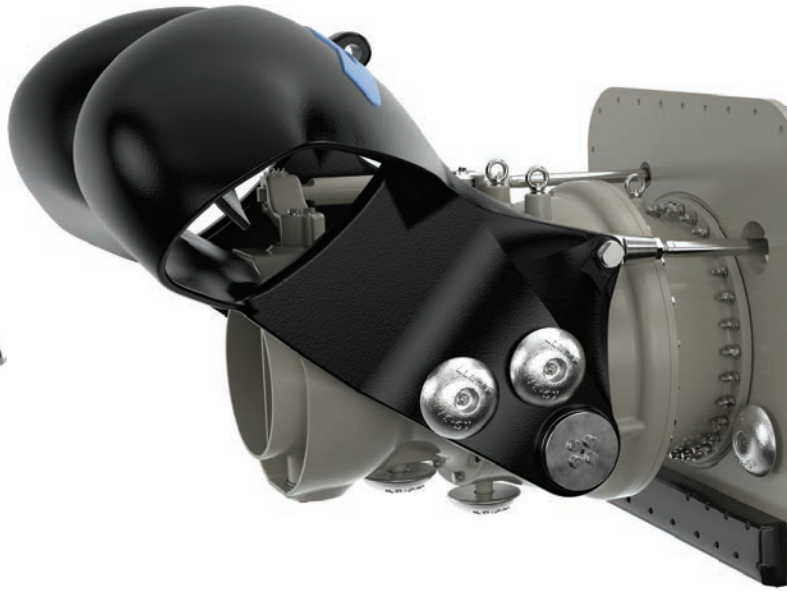
A U.S. Navy Mark VI patrol boat with waterjet propulsion.

The propulsion system is a critical part of all patrol craft. There are different types of propulsion systems available for use on these craft, and selecting the "best" one for the application at hand is not to be taken lightly. You will note that I used "best" in quotes, which I've done to hint at the subjective nature of the decision. Propellers, waterjets, sterndrives, outboards – they are all commercial off the shelf technologies which are mature and used in different patrol craft applications. They offer similar performance and reliability (provided they are sized appropriately), and each type offers one or more unique characteristics worth noting.

Ensuring that the marine propulsor is appropriately sized for the application is the number one consideration. If the system is undersized or oversized, its performance will be sub-par, and the negative impacts could be around to haunt the operators for the life of the vessel. The primary factors associated with the correct sizing of the propulsor are 1) thrust loading, and 2) mechanical strength. In short, the propulsor must operate within acceptable thrust loading boundaries (which are a function of vessel speed, thrust output, and blade area) to provide good efficiency (fuel economy) and avoid cavitation (low noise and vibration). Secondly, the

An example of a sterndrive unit.

Konrad Marine

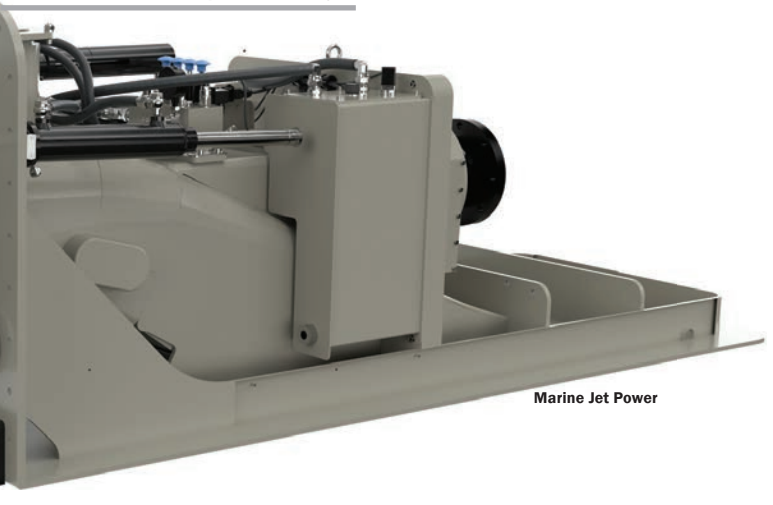


	FFP on Inclined Shaft	Outboards	Sterndrives	Waterjets	Surface Piercing Propellers
Efficiency (Below 40 kts)	★	☆	★	☆	☆
Efficiency (Above 40 kts)	☆	☆	☆	★	★
Capital Cost	☆	★	★	☆	☆
Maintenance Cost	★	☆	☆	☆	★
Component Weight	★	★	☆	☆	☆
Maneuverability	☆	☆	☆	★	☆
Operational Draft	☆	☆	☆	★	★
Noise & Vibration	☆	☆	☆	★	★
	Best ★		Better ☆		Ok ☆

device must have enough metal to withstand the torque, thrust, and other forces resulting from operation for reliable operation. We all know that equipment failures occurring during engagements are highly frowned upon.

When selecting propulsor size, the mechanical strength part is easy—the vendors have data tables on the equipment specifying the appropriate duty rating and recommended power limits. All equipment manufacturers and their distributors will help you pick the right size components and supply you with a good product, but you must decide what product you want first. This is the subjective part, which comes first in the selection process.

An example of a waterjet.



Marine Jet Power

Column
Propulsion

What type of propulsion system do you want? The needs of the vessel mission will ultimately drive the selection, within reasonable bounds, of course. Are swimmer safety or shallow draft key elements? If so, then a waterjet is a pretty good choice. Is maximum speed and light weight paramount? Then a surface piercing propeller might get the nod. Is the platform big and heavy enough that four 18" diameter propellers will cavitate prior to hump speed? Then outboards aren't an option. The table on page 19 lists the key performance characteristics I consider every time I work with a customer to select a propulsion system type. For each propulsor type, there is a qualitative ranking against those performance characteristics. Use this to guide your selection. If you are unsure about the decision based on your gut feel and this table, you probably should call your naval architect.

The thrust loading part of the sizing equation is not necessarily challenging, but it does require inputs from the designer and end user that are critical to the process. The physical size of the propulsors must be selected to suit the maximum amount of resistance that the vessel will experience and is expected to perform in. Allowances for vessel weight growth, payload growth, overload operational conditions, marine growth, added resistance due to waves, head winds, and towing requirements (sometimes at high speeds) must be included in the resistance estimates used for selecting the right size propulsor.

You'll find that once you pack up the allowances in a tactical fashion, and begin working through the equipment distributor, you need a big set of wheels. Maybe not huge, but bigger than you originally thought. This is always the case for high-speed vessels, which must carry heavy payloads in demanding conditions. Instead of defaulting to the traditional path of going bigger, look at the current trend of sticking with smaller units—but installing them in a higher quantity. The fast crew vessel boat industry is the trend setter here in my opinion, and we are all aware that the recreational boat industry is following this track as transoms are covered with outboards these days. While it may seem odd to consider deviating from twin screws on a normal boat, the demands on patrol boats are now anything but normal.

A U.S. Coast Guard 25-foot Response Boat-Small underway powered by dual 225hp outboards.

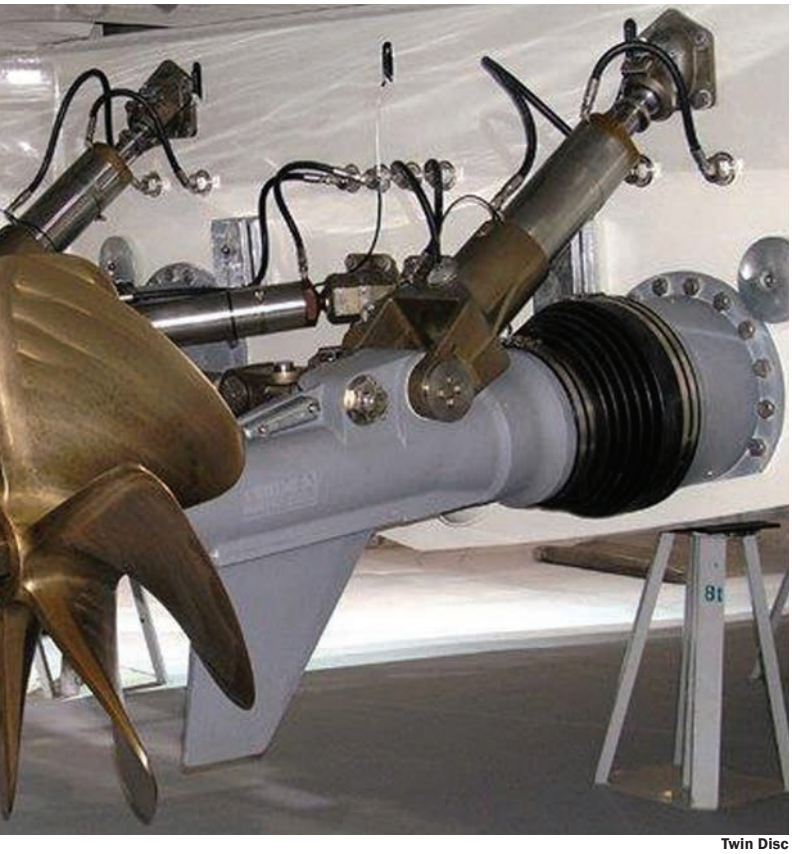
Rich Condit / U.S. Coast Guard

An example of surface drives.

The two primary benefits of increasing above two drivelines are:

- ***Graceful degradation*** – if a boat with two engines loses one shaftline, odds are it will not accelerate through hump. If a boat with more than three engines loses one shaftline, odds are it will be able to accelerate through hump and attain planing speeds.
- ***Increased Availability*** – With multiple shaftlines the smaller equipment is more affordable. It becomes possible (although maybe not palatable) to maintain spares on hand, enabling an approach of maintenance by replacement.

IMO III and EPA 4 requirements are driving commercial operators to adopt this approach to keep propulsion engines under 600 BKW (800 BHP) of rated output. In the case studies that I've examined in the past, I've found that the equipment costs are similar between the two different scenarios (this is without considering the cost of the exhaust after treatment now required on the larger engines). The point is there are lots of people exploring the benefits on increased quantity instead of size—so should you.



Twin Disc

SAFE Boats

SAFE Boats International will build up to 8 Mark VI patrol boats for Ukraine under a current contract with deliveries beginning this year. Meanwhile, the future of the U.S. Navy Mk VI Class remains in question.

Updates, Developments and Advances in COMBAT AND PATROL CRAFT

By Don Gale

My first visit in 2007 to the American Society of Naval Engineers' (ASNE) Multi-Agency Craft Conference (MACC) was an eye-opener. Having built a naval architecture career with frigates, destroyers and other large naval and commercial ships, I was eager to learn of the smaller craft used by the U.S. Navy and other government and military bodies. As my flight into Norfolk, Va. descended over Chesapeake Bay, I gazed in amazement as a Landing Craft Air Cushion (LCAC) raced toward Virginia Beach, slowed, glided up the beach and into its shore base. Being awestruck then, I'm honestly blown away by today's developments in combat and patrol craft.

The upgraded LCAC 100 series is in build by Textron Marine & Land Systems of Slidell, La. The first 24 of 73 planned are contracted and will replace 72 legacy LCACs which power on, courtesy of the Navy's LCAC Service Life Extension Program (SLEP). The 20-year-to-30-year SLEP provides a time window for LCAC 100 Class tests, verification and incorporation into the Navy's new Ship-to-Shore Connector (SSC) program.

SSC will serve essentially the same military and humanitarian amphibious functions of the legacy LCACs. Powered by four 6,168HP Rolls-Royce MT7 gas turbine engines, principal characteristics include overall length and beam (LOA, BOA) of 91.8 ft. and 48.25 ft., respectively. Speed rated to 35 knots in Sea State 3 and maximum payload rated to 74 short tons, SSC LCACs enjoy a 25% power upgrade, and the skirt and other components are engineered for reduced maintenance and improved craft availability.

LCAC 103 has engaged the first phase of Ship Interface Testing and successfully completed well deck interoperability trials. Tests were completed by PEO Ships and the Naval Surface Warfare Center (NSWC) Panama City Division in Florida with the USS Carter Hall (LSD 50) on February 13, 2022.

Captain Scot Searles, Amphibious Assault and Connectors Programs program manager at Program Executive Office (PEO) Ships, expressed satisfaction. "The success of the well deck testing and […] evolutions validates these modernized craft will be a game changer for the Navy/Marine Corps team as they execute various missions in the maritime domain," Searles said on completion of the test.

Meanwhile, the upgrade to the Navy's legacy 53-foot Riverine Command Boats (RCB), the Mark VI Class is sidelined. From August 2014 through 2018, SAFE Boats International (SBI) of Bremerton, Wash., delivered 12 of 48 originally planned 85-foot Mk VI patrol boats to Navy Expeditionary Combat Command (NECC). Plans to deactivate the boats last year were abruptly reversed pending FY 2022 defense budget resolutions. The impasse results largely

Michael Macdonald / U.S. Navy

LCAC 103 underway enters USS Carter Hall (LSD 50) well deck during interoperability testing February 2022 at NSWC Panama City.

from the boats' high maintenance costs and low usage to date.

Mission re-classification of the NECC's Coastal Riverine Force (CRF) to the Maritime Expedition Security Force (MESF) in 2020 has also stalled the nearly-new Mk VI boats. "The plan for the Mk VI patrol boat is [being] worked through with our leadership and Capitol Hill," indicated NECC commander RADM Joseph DiGuardo, Jr. at a recent conference. He added, "Our role is to maintain it in the highest state of readiness … [to] ensure that it's prepared to execute operations when tasked to do so. …" pending further disposition.

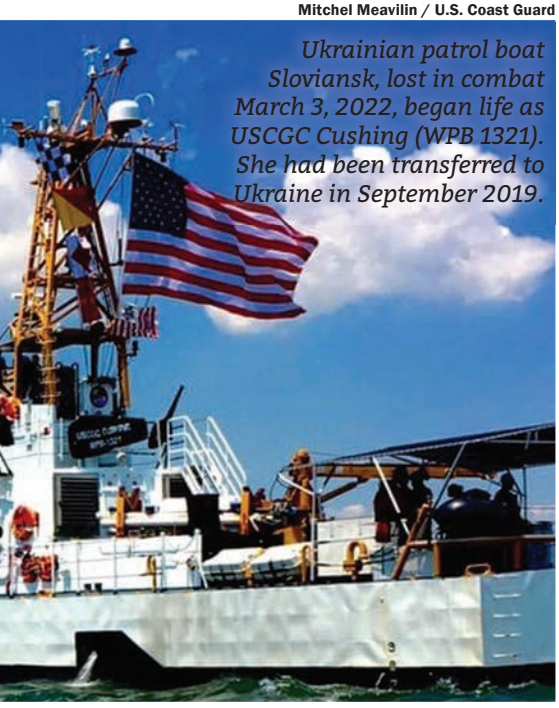
However, SBI are under an $84.2 million U.S. Department of State contract for up six Mk VI boats plus a $25.6 million option for two more, filling orders to meet the now-urgent needs of Ukraine. A grand total of up to 16 boats plus associated equipment to Ukraine was approved June 2020 by the State Department. Transfers will begin in 2022, according to President Volodymyr Zelensky's statement during Ukraine's Day of the Navy event at Odesa last 4 July. Citing the Mk VI new builds in a December 2020 Radio Liberty interview, Ukrainian Navy RADM Alexei Neizhpapa said, "We have completely decided on the weapons systems that will be installed on both the Mk VI and the Island."

Ukrainian news source Kyiv Independent on January 4, 2022 reported that the Mk VI will likely carry MSI Seahawk A2 gun systems, 30-millimeter Mk44S Bushmaster cannons and a short-range missile system. The boats will be used to defend Ukrainian ports, communications and maritime borders in the Black and the Azov seas following loss of Ukrainian naval assets in the conflict during Russia's annexation of Crimea in 2014.

The "Island" cited by RADM Neizhpapa refers to former U.S. Coast Guard 110-foot Island Class (WPB 1301 and follow) cutters that the U.S. has also donated to Ukraine as part of a $2.5 billion aid package following Crimea. Following 2 WPB cutters in 2019, 2 more were delivered this past November as tensions between Ukraine and Russia intensified. That these fine cutters prove reliable for international naval service following decades of duty in the U.S. Coast Guard speaks volumes for American shipbuilding, not to mention the Coast Guard's attention to their maintenance and upkeep.

Sadly, one of these WPBs, the Sloviansk, was reported a casualty in the Russian war against Ukraine around March 3, 2022. Beyond a report on March 6, by Mayor Volodymyr Novatsky, port city of Yuzhny, of missing crew members, extent of casualties is unknown. Sloviansk had served as the USCGC Cushing for nearly 30 years prior to her

Mitchel Meavilin / U.S. Coast Guard



Ukrainian patrol boat Sloviansk, lost in combat March 3, 2022, began life as USCGC Cushing (WPB 1321). She had been transferred to Ukraine in September 2019.

transfer to Ukraine in 2019.

Troy Knivila-Ritchie, marketing and sales specialist at SBI, confirmed extensive ongoing global business: "We are still producing CB OTH boats (26' center console, inboard) for the U.S. Coast Guard. Through U.S. Coast Guard FMS programs we have plans to deliver several boats to countries in South America, Caribbean, Eastern Europe/Western Asia, Africa, Middle East and Asia. So, basically [we're] all over the world."

Knivila-Ritchie referred to the Cutter Boat, Over-the-Horizon, fourth generation (OTH IV) contract awarded SBI in April 2021. Supplementing a contract filled by SBI since 2013, a 12 April 2021 contract calls for up to 20 more of the open 26-foot, 40-knot diesel-powered inboard OTH IVs through April 2024. With a 200 nautical mile range, OTH IVs are deployed aboard National Security, Fast Response and

SAFE Boats

SBI completed an order last December for 52 Coastal Interceptor Vessels for U.S. Customs and Border Protection.

Leidos Holdings

Offshore Patrol Cutters (NSC, FRC, OPC), extending operations up to 70 nautical miles from the mother ship.

SBI's contract ensures OTH sustenance during the Coast Guard's development of the next-generation CB-OTH V program. On June 3, 2021, the Coast Guard awarded four contracts, for one design demonstrator boat apiece, to Blackfish Solutions LLC of Anchorage, Alaska;, Metal Shark Boats of Jeanerette, La.; Inventech Marine Solutions LLC of Bremerton, Wash.; and MetalCraft Marine USA of Watertown, N.Y.

Following demonstrations, a single contractor will be chosen to for an indefinite-delivery, indefinite-quality (IDIQ) $100 million contract to fill OTH V orders over 10 years. With dimensions and performance requirements similar to the OTH IV, the OTH V will incorporate technology improvements. Among these is the first wave-impact shock monitoring system aboard a Coast Guard boat, providing real-time feedback crew feedback.

In December 2021, the U.S. Customs and Border Protection accepted delivery of the last of 52 SAFE Boats Coastal Interceptor Vessels (CIV) to its Aviation and Marine Operations (AMO) unit. SBI began delivering 41-foot CIVs to USCBP in 2016 under a $48.4 million contract. Powered by four 350HP Mercury outboards, the high-speed interdiction CIVs are capable of 58 knots, a maximum 350 nautical mile range and 10 hours endurance. CIVs support the CBP AMO's mission of combating maritime smuggling and terrorist activities.

MetalCraft Marine in Watertown, N.Y. and in Kingston, Ont., have a robust order book. On February 7, MetalCraft delivered its first full-rate production Cutter Boat, Large (CB-L) to the USCGC Dauntless (WMEC 624). MetalCraft are now filling an order for 17 more CB-Ls with a program potential total of up to 36 boats. At 22 feet, the 38-knot, highly maneuverable CB-L carries a Volvo Penta diesel with a dual-propeller outdrive. Medium endurance cutters and buoy tenders are among the ships

from which CB-Ls will deploy. A $43 million U.S. Navy contract awarded in March for 45 8-meter Force Protection Small, and 20 12-meter Force Protection, Large patrol boats also promises to keep MetalCraft busy.

MetalCraft supplied the Coast Guard with the second-generation Long Range Interceptor (LRI-II) for deployment aboard National Security Cutters from 2012 through 2018. The Coast Guard has begun acquisition of a third generation LRI-III as LRI-II approaches end of service life. Pre-solicitation documents issued June 2021 through this past March cite concerns including favorable ventilation characteristics not reliant on HVAC, mitigation of water intrusion to hull and systems, and enhanced system resilience in high latitudes. A Request for Proposals (RFP) is expected to be issued around May 2022, with a single five-year IDIQ contract intended.

Among awe-inspiring developments in our industry are autonomous vessels (AVs). In April 2021, Leidos Holdings delivered the 132-foot, 145-ton high performance autonomous Seahawk trimaran to the Navy under a $35.5 million contract awarded by the Office of Naval Research (ONS) in 2017. Seahawk provides the Navy with a high-capability, high-availability, rapid-response global maritime surveillance resource. Along with Metal Shark's ongoing work with the U.S. Marines' Long-Range Unmanned Surface Vessel (LRUSV), we can surely expect to see more AVs in the combat and patrol arena.

Boston- based Sea Machines Robotics announced March 14 that its SM200 and SM300 AV control systems were granted type approval by Bureau Veritas (BV). The SM300 has been employed aboard a 29-foot Metal Shark Defiant in use by the U.S. Coast Guard since late 2020 on which Sea Machines and Metal Shark collaborated. The American Bureau of Shipping (ABS) is likewise working closely with industry stakeholders in developing and risk management of AV design and operation. Such activity will further facilitate AV infusion into combat and patrol craft.

The world of combat and patrol craft has advanced exponentially since MACC '07 and promises to continue doing so. From new generation amphibious vessels to the globally capable Mk VI and Coast Guard cutter boats, from legacy cutters in Ukraine to cutting-edge AVs, change remains the enduring constant. Engineers, naval architects and builders are meeting the pressing needs of combat and patrol boat customers, and the results are evident.

David Clark Company

MARITIME COMMUNICATIONS: *Easier, Faster, Cheaper*

By Tom Ewing

In November 2021, GTMaritime published a white paper: "Maritime Communications - A look over the horizon." The report, available at https://www.gtmaritime.com/download/, is built around three broad Sections – 1. "Basics of marine Communications;" 2. "The connected ship;" and 3. "Special services." Then, each Section presents a closer look at various topics. The "Basics" section, for example, covers regulatory issues established by IMO treaties and national agencies. It presents the terms and concepts that define satellite systems and networks, including an explanation of various electromagnetic bands, e.g., L-Band Ka, Ku (important for maritime VSAT), and how they are used by satellite and equipment providers. The "connected ship" section covers cybersecurity and performance monitoring. "Special services" looks at training, telemedicine and future communication planning.

Each topical section closes with an "On the Horizon" summary that anticipates emerging issues and how they are likely to develop in the not-too-distant future, which, in this fast-moving field, closes in rapidly. If maritime communications is one of your assigned duties, this 54-page guide provides a solid workplace foundation.

As in every other field closely linked to technology and digitalization advances in maritime communications present a fascinating array of new and emerging opportunities. These developments are changing just about every aspect of every singular way that communication occurs – from co-worker conversations to safety monitoring to vessel tracking to Internet-of-things capabilities and, eventually, to remote and maybe even autonomous operations. And it's an optimist's world: service is better, capabilities are expanding, costs are declining.

Depending on its work zone, not every ship faces the same communications demands and the equipment to meet those demands. The Global Maritime Distress and Safety System (GMDSS) is a starting reference, and, in some ways, a historical one. In general, GMDSS requirements increase the farther a vessel works from a coastline and moves to increasingly distant Sea Areas (1 thru 4), where each Area demands upgraded communication links to, minimally, meet Safety of Life at Sea (SOLAS) requirements.

Digitalization: Unstoppable

In 2022, though, while safety is still a foremost concern, the notion of limited, bare-bones communication, based largely on the need for emergency contact, is, well, so yesterday. Now, VSAT (very small aperture terminal) satellite linked digital systems pretty much give a captain and crew whatever they want regarding communications, whether for people on board or for reports from the vessel itself, whether operations are ten miles from shore or 1,000 miles.

Chris Watson is VP marketing and communications with KVH Industries, Inc. KVH provides hardware and communication services across the marine sector. "We are seeing trends throughout the commercial maritime industry," Watson said, "for VSAT and IoT connectivity. Cellular service is also important when vessels are in port or working closer to shore, e.g., tugs working in rivers and harbors."

A big change over the last few years has been increased availability from satellite technologies because of investments in Ka and Ku bandwidth (the abbreviations reference specific sections of the electromagnetic spectrum. Again, see GTMaritime's white paper.) Older bandwiths, e.g., L-Band, are congested, with high prices. New capacity is important for service and economics.

Ku and Ka costs have dropped. Ka, for example, has lower manufacturing and transport costs. Ku band coverage is more extensive and may be better for a customer's particular operations. Ku band is used for most VSAT systems.

"The migration from L-band to Ku-band VSAT," Watson explained, "has been going on for several years, but has really accelerated recently because ship operators know there are cost benefits with digitalization." These benefits include higher quality Internet service and personal communications for crew members – important for morale. With VSAT, a crew can engage in video conferencing. The vessel can install security cameras. Tech and operations support can be remote. These systems are flexible, too – they can be configured, for example, to automatically switch from VSAT to cellular when a vessel is in port.

KVH's TracPhone system, for example, offers unlimited data, vessel tracking and a dedicated voice channel. It includes an advanced network-level firewall to assess and mitigate risks. Physically, system requirements are mini-

Satellite Industry Association

Therese Jones, Senior Director of Policy for the Satellite Industry Association, said new satellite communications services are continuously coming online. Technology is edging towards a world of 5G and IoT maritime applications, Jones said. "These services," she added, "may allow for autonomous vessels, and connected IoT sensors may be used for different applications from fuel sensors to monitoring emissions, or real-time performance evaluation of vessels."

mal: a satellite communications antenna. Operationally it just needs an active airtime account. Collins said that with KVH's mini-VSAT Broadband satellite network "each vessel can choose a particular airtime package, i.e., amount of data, for their needs, such as email, crew Internet, etc."

Noise fighting algorithms

Crew communication is another area in which technology is making striking advances, particularly in difficult environments. Consider David Clark Company's digital intercom systems designed for the high-speed, small boat market, where unbroken communication is vital, e.g., police interdiction, search and rescue and firefighting.

When Zodiac ZH outfitted its 1300 OB Hurricane interceptor it chose David Clark's 9100 system because of its versatility and ease of use, and it provides full intercom and radio functions into each user's headset. Indeed, the Hurricane's four 350 HP Mercury outboards make for a very noisy workplace. The 9100 headsets effectively block the noise but still allow communication.

"The 9100 series uses SMART VOX technology that adapts to background noise in real time," explained Bob Daigle, systems manager with David Clark Company. Algorithms distinguish noise from speech, for instantaneous and effective mic control with no manual adjustments.

"The Series 9100 is easy to configure and operate," Daigle commented. A simple user interface, accessible via laptop computer, allows crews to program individual user access, talk and listen, for intercom and each radio on the system, including priority settings. As necessary, say, when boarding another vessel, crews can reconnect a headset to a wireless belt station to maintaining communication.

"The 9100 offers flexibility and redundancy," Daigle explained further. "For example, a coxswain on a police interdiction boat would want a wired headset station in order to provide remote push-to-talk switches on a throttle control, so as to key a radio without taking one hand off the steering wheel."

Wireless is reliable up to 100 meters; however, in optimal line-of-sight conditions the range can reach up to 500 meters.

Engineering evolution

Another technology being developed for expanded communications is VHS Data Exchange System (VDES). In

its white paper, GTMaritime refers to VDES as an automatic identification system (AIS) "on steroids." Development was started by the International Association of Lighthouse Authorities' e-NAV Committee.

VDES will make it possible to send broadband data without a satellite link, making communication more economical. However, service would be limited to near coastal waters, say, within 50km from the nearest land-based equipment. Still, if a vessel works solely in Sea Area 1, and doesn't need global connectivity, VDES will provide upgraded communication and navigation without increasing costs. GTMaritime writes that "VDES is capable of facilitating numerous applications for safety and security of navigation, protection of marine environment, efficiency of shipping and others."

Jan Safar, PhD and Alan Grant, PhD are researching VDES with the R&D arm of the General Lighthouse Authorities of U.K. and Ireland. In September 2021 they presented a paper – "VHF Data Exchange System on-air trials: The journey so far" – to the Institute of Navigation conference in St. Louis.

In reply to email questions, Safar and Grant said they expect that with a "high power" setting, VDES coverage should extend to about 22 n-miles, at least from their working reference point (Harwich, UK, on the North Sea coast). Noise levels – from machinery to other radio equipment – remain an issue. Research continues in 2022.

Safar and Grant were asked about interference from wind energy towers. They said that "in brief, we saw an impact due to reflections from the rotating windmill blades but only in

close proximity (perhaps within a few hundred meters)." New receiver designs, they said, should offset this and they don't expect a significant deterioration in performance. "However," they cautioned, "this remains to be verified."

In March, Saab and the Danish tech company Sternula ApS announced a VDES partnership in which Saab will provide 32 AIS/VDES ship transponders with "both terrestrial and satellite VDES functionality." In the announcement, Saab refers to VDES as "the next generation of AIS" and that "VDES will increase maritime safety and contribute to a greener shipping industry." Sternula writes that "for the rest of this decade, (VDES) technology will enable a shift from today's manual administrative processes to a highly automated maritime industry." System installation started in March and continues to January. The pilot will include working customers and will also inform Sternula's MARIOT project, i.e., the company's maritime Internet-of-Things research.

The connected ship

Digitalization, of course, has changed the whole concept of communications; considered mostly just a human trait not that long ago. Now, humans don't even need to be present. This trend is really just starting; it places new demands on software and satellites.

GTMaritime's report explains that vessel monitoring has been around for almost 20 years, calculating such factors as fuel use, engine power and load and ballast capacity. However, only the ship's crew could take real time advantage of that information. Data could be archived but a historical review was too late for real time decisions about fuel consumption or operational efficiencies.

Communication advances are now making real time awareness standard, and not just on the vessel itself. Isolation is over. Software now provides real time data to a shore office or a cloud-based reporting system, allowing company personnel anywhere, anytime to be active in the ship's sailing.

GTMaritime references the Marorka Onboard system to exemplify these advanced software-communication developments which can include numerous metrics such as fuel consumption and electricity production and consumption. By tracking multiple vessels simultaneously, for example, managers can identify, and correct, a vessel that

David Clark Company

isn't operating optimally compared to others in the fleet. Looking ahead, IoT applications will move connectivity to the next level.

Outer space

GTMaritime predicts that these new demands will increase the load on communications systems. However, they further predict that this new monitoring and tracking will reduce energy costs to such a degree that the level of fuel savings is likely to cover the extra cost of communications "many times over and at the same time allow capacity for further changes such as assisted maintenance or remote operation."

Therese Jones is senior director of policy for the Satellite Industry Association, based in Washington, DC. She said that new satellite communications services are continuously coming online. Technology is edging towards a world of 5G and IoT maritime applications, Jones said. "These services," she added, "may allow for autonomous vessels, and connected IoT sensors may be used for different applications from fuel sensors to monitoring emissions, or real-time performance evaluation of vessels."

Jones referenced planned studies to consider new maritime satellite service allocations "to enable a new VHF Data Exchange System satellite component." She said that new remote sensing applications are emerging, and she referenced "synthetic aperture radar (which) can be used to detect dark vessels at sea, monitor ice flows in the Arctic/Antarctic, and see through clouds even during hurricanes. Radio Frequency (RF) mapping from space can detect individual RF sources, and thus can even detect handheld radios onboard dark vessels."

Another developing topic is IMO's efforts, in May, to finalize changes to the global maritime distress system, modernizing and expanding system capabilities, particularly with reference to satellites. Also upcoming: a June meeting of the Sub-Committee on Safety of Navigation, Communication and Search and Rescue (NCSR).

In commenting about the future, Jones cautioned that cybersecurity issues should be at the forefront of communication planning. She said that system users can get careless while hackers get increasingly sophisticated. "I have heard of users not changing the default passwords of their terminals, for instance," she added.

KVH's TracPhone system offers unlimited data, vessel tracking and a dedicated voice channel. It includes an advanced network-level firewall to assess and mitigate risks.

SAFE Boats: Keeping 'Em Coming

Despite all of the challenges that COVID-19 has wrought upon the marine industry, SAFE Boats International has managed to keep building and delivering boats to its customers. A snapshot of the last six months has seen the Bremerton, Wash. boatbuilder deliver more 30 boats, and it has a healthy backlog to keep busy for the next year and beyond. Its range of boats and customers runs from small to large, and deliveries stretch across the globe.

Below are highlights of vessels SAFE Boats has delivered from late last year:

- **Since last December two 23' outboard-driven T-tops have been delivered to two customers on the East Coast.**
- **Also in December, SAFE Boats shipped two 65' full cabin inboard diesel, jet-driven vessels to the Tunisia Navy.**
- **In January, the company delivered its 52nd 41' Coastal Interceptor Vessel to Customs and Border Patrol - the conclusion of a successful, long-term contract. The CIV is a highly maneuverable T-top equipped with quad outboards up to 1,600 horsepower, capable of speeds in excess of 55 knots.**
- **Since December, SAFE Boats delivered four more 26' CB-OTH inboard vessels to the U.S. Coast Guard, part of an ongoing contract.**
- **During February and March, the firm has delivered four 38' full cabin boats: one to the U.S. Navy, one to the U.S. Air Force and two**

All images: SAFE Boats

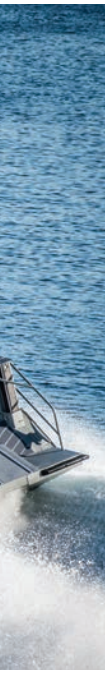
to foreign customers.

- **A relatively new configuration to the SAFE Boats lineup, the builder delivered its second 27' walk around cabin, tow boat edition.**
- **In December, January, March and May, the company delivered four traditional 27WACs to customers in Massachusetts, Virginia, North Carolina and Michigan, respectively.**
- **The builder just completed on-site training in the Republic of Georgia aboard four 27' full cabins that were delivered in April, part of the United Nations' International Organization for Migration.**
- **Some of the other vessels SAFE Boats delivered include a 29' T-top for Delaware and another going in to service in Colombia, a 33' full cabin to a fire department in Connecticut, a 35' full cabin delivered to a port here in Washington state, a 35' T-top for a sheriff's office in Texas, a 29' WAC for a sheriff's office in Wisconsin and two 29' T-tops to an agency in Florida.**
- **These deliveries are in addition to the $90 million Mk VI Patrol Boat contract the builder has with U.S. State Department to deliver six of those vessels to Ukraine. The first boat on this order is expected to be delivered around the end of the year. This contract is responsible for expanding SAFE Boats' workforce by creating 75 new positions and allowing us to reopen its Tacoma, Wash. large craft production facility.**

SAFE Boats, like many other domestic and international boatbuilders, has not been immune to the supply chain issues plaguing manufactures and consumers alike. "Despite the numbers indicated above, there are many boats we have not been able to deliver on time because of delays in receiving items such as engines, major components and trailers," said Troy Knivila-Ritchie, marketing and sales specialist at SAFE Boats International, "Our procurement department has performed minor miracles scouring the nooks and crannies of the internet to secure parts from non-traditional suppliers in order to complete boats. Additionally, some of our customers have made the decision to switch their favored engine packages to another manufacturer in hopes of getting their boat in-hand sooner."

Knivila-Ritchie said the majority of SAFE Boats' customers are state and local law enforcement and fire departments. "Because we are seeing 12-to-18-month delivery times from some engine manufacturers, our customers are having to wait much longer to receive their completed boats," he explained. "It really goes without saying, but first responders can't afford to wait that long to get their boats out on the water to do the important job of saving lives and patrolling the waters around their communities.

"We are doing everything we can to mitigate the delays related to supply chain issues. While there is a dim light at the end of the tunnel, we will continue to look for ways to deliver completed boats on time with the same level of expert quality and attention to detail that our customers have come to expect from SAFE Boats."



IMTRA: Growth from Within

By Eric Haun

IMTRA, the New Bedford, Mass.-based manufacturer and importer of solutions and products for the marine, energy and transportation markets, recently underwent a change in ownership. But even under new owners, so much about the company, including its makeup and offering, will remain unchanged. And that's because the new owners are the company's existing employees.

Eric Braitmayer, president and CEO, said IMTRA's leadership—including vice president of recreational sales Chip Farnham, third generation of the family that founded IMTRA some 70 years ago—was planning for the future when it decided a change in ownership structure would be necessary. But they also knew they wanted to maintain as much of the company's DNA as possible, including its nimbleness and customer-first mentality.

"We felt really strongly that bringing in outside ownership was going to impact our culture—not necessarily in a bad way," Braitmayer said, noting that with new investors could potentially come new challenges or unwanted changes. "We felt really strongly that we had a special formula here, and we had 70 something people that had invested their careers in this, and we didn't want things to get derailed quickly."

So Braitmayer and IMTRA's management team did their research, weighed their options and determined that selling the company to its employees would be the best move. IMTRA announced in January that 100% ownership

IMTRA

rights of the company had been sold to its employees through an Employee Stock Ownership Plan (ESOP), which allows the leadership team to stay in place while providing a competitive return for the shareholders—without the potential challenges that often come with a change in control of a closely held business.

"It really checked a ton of boxes for us," Braitmayer said. "There's a misinterpretation that if you sell to your employees, that somehow you're going to receive less than you would from another buyer. And I don't believe that's actually the case."

"You get to keep your management team intact, and you get to basically involve all your employees. Personally, I believe that employee ownership is also a great opportunity for us in the states to address wealth inequality. And while that sounds really philanthropic, which I believe in building that out, I don't feel that came at some sort of discount that the [previous ownership] had to give. We feel super happy with the price that we got and the way that the transaction played out. And I'm really excited about what it's going to do for our employees as we go forward."

"We have a core of really great mid-career people," Braitmayer said. "With this setup, the employees, all of them, they're going to earn their ownership stake. . . Now we just have to develop great leaders that are going to be able to run the business, maintain the culture, continue to be focused on our customers, finding new products, finding new solutions for the customers that we work with, continue to do what we've done for 70 years, and the ownership part will take care of itself."

Growth plan

While the company has been growing, it has its sights set on even more expansion. "Since May of 2020, we have been on a torrid stretch where we've seen our top line numbers grow by about 35%," Braitmayer said.

He noted that IMTRA is investing to grow its physical footprint to more efficiently handle its increased flow of products, and that it is working closely supplier partners to understand their supply chain challenges and how to best keep products flowing for customers.

"We're continuing to invest in our people, which is our number one resource," Braitmayer said. IMTRA has been adding staff and is looking to hire for several more positions, specifically for serving the commercial marine market where the company sees significant opportunities.

According to Braitmayer, IMTRA is well known in the commercial marine space for several key products, such as Sleipner thrusters; Norsap chairs; Exalto, Decca and Roca wipers; plus a large spread of both self-manufactured and sourced lighting solutions.

"We're continuing to look to expand our commercial portfolio. In the last couple of years, we've added a couple of great relationships," Braitmayer said. The executive cited growth opportunities from working with Norwegian company Libra, which supplies doors and hatches, as well as a recent partnership with KPM Marine, an English manufacturer that does air handling systems and bilge pumps. "And we're always looking for more."

Braitmayer explained that IMTRA "very strategically" chose to do much of the ESOP financing through existing ownership to maintain the company's borrowing power and resources should the right opportunity arise. "If a new product line comes on and we need to invest in inventory, we're more than able to do that. If the right acquisition opportunity came up, we'd be eager to consider those things as something that we could leverage for the future," he said. "When we structured the deal on the ESOP, we wanted to make sure that how we did it didn't hamper us from those kinds of normal business growth trajectory, things that we would've been doing, whether we did the ESOP or not."

Where Failure is not an Option

All images: Parker Hannifin

Naval vessels cannot afford to lose critical systems following an impact. Brian Stanton, North America Engineering Lead at Parker Hannifin Gas Turbine Division, talks about the extensive testing required for inlet filtration systems used on these ships.

By Brian Stanton, North America Engineering Lead at Parker Hannifin Gas Turbine Division

Inlet filtration used for critical ship systems, such as on the propulsion gas turbines, must pass rigorous testing prior to installation. These tests include a range of vibration and shock tests that simulate ship operation and test the working of the system in the event of an impact or explosion.

Vibration testing

Navies have standards for vibration testing. In the US, for example, MIL-STD-167-1A details requirements for US Navy vessels to ensure equipment remains reliable with vibration from the engines, propellers, and other onboard systems. It details a testing range of 4-33 Hz, although a specific vessel may only require a smaller range.

Testing begins with an exploratory phase whereby equipment is fixed to a vibration table and testing at each frequency for a brief, 15 second interval. This helps establish that there are no obvious problems before more in-depth testing commences. At lower frequency ranges, the test table uses higher amplitudes, and at higher frequencies, lower amplitudes.

The table is then adjusted to run each frequency for a period of five minutes. Based on readings from accelerom-

eters, the endurance test frequency or frequencies will be established. If the accelerometers show no suspect areas across different amplitudes, the highest range is selected and run for an extended test period of two hours. If there are two ranges that appear to cause vulnerability, each is run for one hour. If more ranges require extended testing, they run for 40 minutes each. After two hours (or longer if more ranges require investigation), the engineer can confirm whether the equipment has any issues that require remedial work. If this is the case, testing will need to be repeated. Hopefully, the shorter tests at the beginning of the test cycle will help to ensure any suspect areas are identified and corrected before the longer testing cycles.

Shock testing

On successful completion of vibration testing, equipment is prepared for shock testing. These tests, which in the US are covered by the MIL-DTL-901E standard, are designed to ensure ships will remain in operation even after an explosive impact.

Testing is broken into three ranges: light, medium and heavyweight. Smaller tests use a hammer with adjustable height and weight. The equipment is fastened to a plate, which is struck by the hammer to simulate small shocks. The orientation of the test table is varied according to the class of equipment and how it will be mounted onboard, with hammer strikes at three different heights at up to three orientations.

Medium shock testing uses a bigger hammer with more height options. The hammer height is adjusted according to the overall payload required and size of the equipment. Again, different impact orientations are tested.

More payload is needed for heavyweight testing. The equipment is rigidly mounted on a baseplate or loading arm on a floating barge, with orientation depending on where it will be fitted to the ship, whether that be on the hull, deck, or an internal section. An explosive device is used to simulate impact and is sited at relevant distance away from the barge. The depth in the water is also varied according to the size of the charge, with greater depths used for higher charges.

Blasts are set to impact across and in line with the ship. The in-line explosive is set furthest away and is generally the last test to be carried out as it is the least destructive and the easiest to pass, enabling modification to be made if required from earlier tests to avoid having to carry out the complete test suite again if problems arise. Lateral explosive tests are set to get progressively nearer the barge.

Summary

Vibration and shock testing is vital for inlet filtration systems as these are essential to ensure reliable operation and the ability for the ship to get back to a safe place where damage can be repaired following an explosion or event. Parker filtration systems are used by various navies throughout the world with the surety that they will continue to operate and keep the vessel operational when in combat.

Understanding and designing systems to withstand shocks and vibrations are fundamental to the supply of onboard systems. Testing is complicated, with many different aspects covered to ensure it reflects the diversity of potential issues in real-world operation.

Parker has the in-house expertise to support naval applications and its equipment has a proven track record for performance and reliability in the harsh conditions vessels may be exposed to.

Truckable Tug

Elliott Bay Design Group

Naval architecture and marine engineering firm Elliott Bay Design Group (EBDG) has partnered with Tacoma-based workboat builder Silverback Marine to design what it says is a compact yet mighty tugboat that can be transported by truck over the road.

The truckable tug has an overall length of 25' - 10 ⅞", a beam of 14' - 6" and a draft of 3' - 4". This vessel design offers a tug that can be easily transported to job sites with enough power and maneuverability to perform push-assists.

"With 500 horsepower, the tug will produce a bollard pull over 12,500 pounds and has a still water range of 60 nautical miles pushing approximately 10,000 pounds at 4.1 knots," EBDG said.

The design is available with either electric, hybrid, or outboard propulsion options and can be further customized to fit a specific operation.

"This tug can be used in a fleet as an alternative to a traditional, larger vessel and offers flexibility unavailable in standard designs. This vessel can be operated with a one-person crew and does not require compliance with United States Coast Guard SubChapter M Regulations," the company explained.

Haleakala

Matson

Matson's new flat-deck container barge was christened and launched during a ceremony at the Greenbrier Gunderson Marine shipyard in Portland, Ore. on April 23, 2022.

The new barge, christened Haleakala, will be deployed in Matson's Neighbor Island service in Hawaii starting this summer, connecting cargo to and from the U.S. West Coast through its hub terminal in Honolulu.

With a carrying capacity of 620 TEU and room for 72 refrigerated containers, the new Haleakala is double the size of the older barge it is replacing and will increase the efficiency of Matson's service to the neighbor islands. At 362 feet long, 105 feet wide (beam), with a deep draft of 17.3 feet and capacity of more than 12,000 metric tons, it will be Matson's largest barge.

EPF 16


Austal

Austal USA has won a $230.5 million contract for the detailed design and construction of EPF 16, the Navy's newest Expeditionary Fast Transport (EPF) ship. Construction is expected to start later this year with delivery projected for 2025.

Austal USA has so far delivered 12 EPFs. Three additional EPFs are currently under construction.

"Like the previously delivered EPFs, EPF 16 will benefit from the serial production of this program, resulting not only in a world-class ship but also providing assurance to the U.S. Navy that capability will be delivered on budget and on schedule," said Austal USA President Rusty Murdaugh. "Our reputation for delivering quality is a direct reflection of the commitment and dedication of our talented shipbuilders and suppliers."

EPF 16 will be the third ship constructed in the Flight II configuration. "Flight II ships will enhance the original capabilities of the Spearhead class through incorporation of reconfigurable spaces for operating rooms and postsurgical recovery efforts. Combined with the ship's flight deck that is capable of landing V-22 aircraft, Flight II ships provide unmatched versatility," Austal USA said.

Jones Act CTVs

Incat Crowther

Several more crew transfer vessels have been ordered in recent weeks as market players gear up to meet the needs of the growing U.S. offshore wind industry.

In the last week of April, WINDEA CTV announced construction has started on three 30-meter hybrid-ready CTVs. Two of the Incat Crowther-designed CTVs will be constructed at St. Johns Ship Building in Palatka, Fla., and one will be built at Gulf Craft in Franklin, La. The CTVs are scheduled to be delivered in 2023 and will go immediately into service for GE Renewables. The vessels will first operate out of New Bedford, Mass., during the Vineyard Wind I construction period.

Offshore wind developer Vineyard Wind in early May announced it has signed a contract to charter a CTV from Massachusetts-based marine transportation company Patriot Offshore Maritime Services. The 27-meter aluminum CTV will be built at Gladding-Hearn Shipbuilding in Somerset, Mass. for mid-2023 delivery. Based on an Incat Crowther catamaran design, it will be capable of carrying up to 24 technicians and personnel.

The vessel will initially hail from New Bedford and other Massachusetts ports during construction of the Vineyard Wind 1 project. Afterward, it will be based in Vineyard Haven during the project's operation and management phase.

Vineyard, which noted it has an option to charter additional CTVs from Patriot, has also signed a contract with American Offshore Services for a second CTV that will be built by Blount Boats in Rhode Island.

People & Companies


Fagan


Schultz


Poulin


Phillips


Franzke


Hunt


Bernhard


Kirby


Krugh


Fitts


Lewis


Giersdorf

Fagan Confirmed as USCG Commandant

Adm. Linda L. Fagan has been confirmed as the 27th Commandant of the U.S. Coast Guard, clearing way for her to be the first woman top officer in one of the military services. She succeeds Adm. Karl Schultz, who will retire at the end of May. The Senate also confirmed Vice Adm. Steven D. Poulin to become a four-star admiral and succeed Fagan as Vice Commandant.

Phillips Sworn In as MARAD Administrator

Ann C. Phillips has been confirmed and sworn in as Administrator of the U.S. Maritime Administration, filling a position that has been vacant since Mark Buzby's resignation in January 2021. Phillips is the first female to serve in the role.

Franzke to Lead Scania USA

Jörg Franzke has been appointed president of engine manufacturer Scania USA. He succeeds Håkan Sterner, who will move back to Sweden.

New Leadership Appointments at USMI

Timothy Hunt has been named president and Bryant Bernhard, PE, chief technology officer of boatbuilder United States Marine, Inc.

Kirby Named President of MJP Inc

Waterjet propulsion systems supplier Marine Jet Power announced it has appointed Kevin Kirby as president of MJP, Inc. and regional sales director of MJP in the Americas region.

Krugh Tapped to Head Bath Iron Works

General Dynamics has appointed Charles F. Krugh as president of its General Dynamics Bath Iron Works shipyard.

Holland Named MLA President

Barbara L. Holland, partner at Collier Walsh Nakazawa has taken the helm as president of the Maritime Law Association of the United States.

Ingalls Promotes Fitts

Stephen Fitts has been promoted to vice president of contracts and pricing at HII's Ingalls Shipbuilding division.

Lewis Named Partner at MidAtlantic

MidAtlantic Engineering Partners, a civil, environmental and marine engineering and surveying firm, announced that W. Stuart Lewis, P.E. is a partner in the firm.

Giersdorf to Lead American Queen Voyages

David Giersdorf has been named acting president for Hornblower Group's American Queen Voyages for a term of up to 18 months.

Products

1 VETUS

2 In-Mar Solutions

3 Rhosonics

4 Voyager Worldwide

1. HPW Series Waterlocks

The heavy-duty HPW series of waterlocks from VETUS can handle extreme conditions above 500 °F. A cost-effective option, these waterlocks feature rotating bodies and hose connections, a high-capacity water lift design, and excellent sound attenuation.
https://vetus.com/usa/exhaust-systems

2. In-Mar Solutions: Alu Pilot Chairs & Deck Rails

In-Mar Solutions offers a complete line of Alu Design & Services Marine Pilot Chairs and Deck Rails. There is a standard line in addition to the option for custom designs to suit specific needs. Sleek, modern design and maximum utility and comfort are emphasized.
www.inmarsolutions.com

3. Clamp-In

Rhosonics debuted a pipe integration system for the Slurry Density Meter (SDM) – the Clamp-In, designed to make it easy to remove the sensor without interrupting the process. The Clamp-In allows the installation of existing pipes in the process: plastic pipes, metal pipes or even pipes with internal liners. All necessary mounting materials are supplied with the product, including the drill for making the hole in the pipe. One of the main features of this system is the "hot-tap" which allows the SDM to be removed and replaced without stopping the working processes.

4. Voyager Fleet Insight

Voyager Worldwide introduced an upgrade to its Voyager Fleet Insight web software to make it easier to monitor voyage status. Enhancements simplify and streamline core ship management tasks, including improved voyage tracking features and new alerts, the ability to manage office technical libraries and a refreshed map interface. The new alerts function notifies marine superintendents and other team members to significant operational changes, with options to set alerts when vessels deviate from planned routes, unexpectedly change course, stop moving or lose AIS signal. Regular position updates can also be requested at user-defined intervals to help monitor voyages and validate Noon Report information.

5. Fleet Xpress for Shipyards

Mobile satellite communications company Inmarsat said it has made its Fleet Xpress maritime broadband service available to shipyards. Installed during new building, Fleet Xpress for Shipyards eliminates time-consuming and costly installation works in port, offering owners a pre-fitted very small aperture terminal (VSAT) solution included in the initial cost of the vessel, the company said. All terminals, cables and below deck units are installed as a Fleet Xpress line-fit service, allowing the yard to deliver a one-stop solution to the owner.

Marine News 2022 Editorial Calendar

January 2022

Workboat Propulsion

- Passenger Vessels
- Distance Learning: Remote Classroom, Simulation, Online Training
- Police & Fireboats
- Pipes, Pumps & Valves

E-Magazine Edition:

U.S. Offshore Wind: The Growth of an Industry

March 2022

Pushboats, Tugs & Barges

- Shipbuilding Report
- Coatings & Corrosion Control
- ECDIS, Radar & Navigation Equipment
- Fluid Handling Pumps and Filtration
- Spotlight: Q1 Inland Waterways Report

April 2022

Offshore Energy

- Vessel Repair & Conversion
- Rope & Cordage
- Marine Cranes
- Marine Electronics: Communication & Controls
- Heavy Lifters: Deck Machinery & Cranes

Event Distribution:
OTC: May 2-5, Houston, TX
IPF: April 26-28, Atlantic City, NJ

May 2022

Dredging

- Barges
- Material Handling Equipment
- Maritime Training & Education
- Spotlight Q2: Inland Waterways Report

Event Distribution:
Inland Marine Expo: May 23 - 25, St Louis, MO

June 2022

Combat & Patrol Craft

- Multi-mission Workboats
- Patrol Craft Propulsion : Inboard, Outboard and Water Jets
- Marine Lighting
- Workboat Communications

Event Distribution:
MACC: Jul 2022, National Arbor, MD
Seawork: June 21-23, Southampton, UK

July 2022

Propulsion Technology

- Autonomous Vessels
- Workboat Engines
- Water Treatment
- Fuels & Lubricants

E-Magazine Edition:

Inland Waterways: Operations, Expansion & Dredging

September 2022

Shipbuilding & Repair

- Naval Architecture/Marine Engineering
- Barge Loading & Unloading Equipment
- HVAC
- Spotlight: Q3 Inland Waterways Report

Event Distribution:
SMM: September 6-9 Hamburg, Germany
SNAME Expo: October

October 2022

MN100

- Offshore Wind
- U.S. Shipyards
- Inland Waterways
- Health & Safety

November 2022

Great Workboats of 2022

- TBest New Tech
- Power & Propulsion
- Deck Machinery
- Spotlight: Q4 Inland Waterways Report

Event Distribution:
Clean Gulf: December 2022
Workboat Show: December 2022

E-Magazine Edition:

Patrol, Escort & Fast Craft Operations

ELECTRONICS ENGINEER

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Job Location: Med
Contact: Bristol
Description:
Join our Ships division as an Electronics Engineer and take on a meaningful role directly supporting the UK's Royal Navy.

As an Electronics Engineer, you will join either the Maritime Combat Systems (MCS) or Ships Acquisition team, providing a vital service in delivering reliable, sustainable and affordable combat systems support across a variety of in-service equipment and acquisition projects. These unique roles support ship acquisition, helping to bring equipment and systems used by our military customers into service.

The MCS team consists of experts operating in the following technical areas: Surface Ship Combat Systems Group; Underwater Electronic Warfare; Communications Situational Awareness; and Maritime Electronic Warfare and training. Meanwhile, the Ships Acquisition team is responsible for defining and agreeing capabilities with the Royal Navy and delivering these capabilities into service.

Due to the nature of these positions, some attendance to the stated site may be required, and some posts will be reserved for sole UK nationals only.

We strongly recommend tailoring your CV in line with our CV guidance before applying, with specific sections to highlight Key Achievements, Relevant Experience, and Applied Skills & Knowledge.

Responsibilities:
As an Electronics Engineer, you'll monitor, manage and report technical risks, ensuring delivery and the continued safe operation of equipment and systems across the Royal Navy fleet. You'll use your leadership and people skills to motivate and encourage the wider team, while using creative and innovative thinking to present solutions to technical challenges.

Depending on the team you're aligned to, your responsibilities may include:

• Determining customer requirements and generating technical specifications for equipment and/or systems • Managing equipment and/or system requirements and their acceptance throughout the lifecycle • Supporting and managing the systems integration and verification, and assisting with the production, acceptance and resultant configuration control of requirements acceptance procedure • Establishing and overseeing project phase engineering activities from concept to delivery including trials planning and management, installation planning, schedule and transition into service management etc • Challenging technical assumptions to identify improvement opportunities
What you will be assessed against

To be successful with your application you must demonstrate that you meet the following essential criteria:

• Relevant HNC (i.e., Level 4 or higher) qualification in a STEM subject, or equivalent knowledge, skills and experience • Experience in sensors and electronic systems and/or systems engineering and integration • Experience in stakeholder engagement/management

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Marine Marketplace

NEW PRODUCTS

PROFESSIONALS

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3	David Clark Company	www.davidclark.com	(508) 751-5888
33	Environmental Marine, Inc.	www.envmar.com	(606) 561-4697
C2	Lake Assault Boats	www.lakeassault.com	(715) 395-2255
8,9	Marine Systems, Inc	www.marinesystemsinc.com	(985) 223-7100
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