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Baltic exchange

Estonia has the culture, facilities and determination to emerge as a serious European hub for maritime and offshore activities. In a special report, Ship & Boat International speaks to some of the key players in the Baltic country's marine sector

Blessed with 3,800km of coastline and access to the Baltic Sea and Gulf of Finland, Estonia's ambitions to establish itself as a European maritime powerhouse are built on solid foundations.

Indeed, maritime culture courses through the country's veins. Featuring a population of 1.3 million and a cluster of some 2,222 islands (of which approximately 30 are inhabited), the nation is no stranger to the importance of seaborne transport: from the ubiquitous sight of Tallinn's famous ferry fleet, connecting the capital Tallinn to Helsinki, Finland; to the presence of offshore engineering specialists such as MEC and Deck Engineering; and round to established boatbuilders such as Baltic Workboats, Alunaut, AluVenture and Alfa Yacht Production.

According to EC data, Estonia's shipbuilding and repair activities accounted for 5,100 jobs in 2010. Approximately 400 of these persons were employed full-time within Estonian yards/offices and the offshore sector, with the remainder having been subcontracted. Figures released by Estonia's Small Craft Competence Centre (SCC) reveal that offshore vessels

and leisure craft lead the way in terms of vessel exports – the latter category including motor- and sailboats and a mix of canoes, kayaks and tenders. This is perhaps not surprising, given that Estonian waters tend to be shallower than those around Sweden, and that island cruising remains a popular way of unwinding for many Estonians.

Vibrant sector

Certainly, Estonia boasts the potential to rival its Scandinavian neighbours to the north and north-west. This potential was clearly recognised by Finnish naval architect and engineering specialist Foreship, which opened a subsidiary office in Tallinn last year, under the banner of Foreship OÜ (see Ship & Boat International September/October 2016, page 63). At the time, Foreship described Estonia's marine community as "vibrant and growing", although the Finnish company made no secret of its desire to "attract more of the brightest and best from Estonia's naval architecture community" to its ranks. While international cooperation,

investment and partnerships are always welcome factors, the Estonian marine sector would be right to guard against excessive 'brain drain', however. In Ship & Boat International's personal opinion, it would be a shame if Estonia was viewed merely as a source of personnel for other country's boatbuilding ambitions; the country has the potential to succeed in its own right.

When Ship & Boat International visited Estonia in May this year, a few of the companies and individuals we spoke to expressed their private concern that some onlookers may write off Estonia as a 'typical' 'East European country'. While the ageing ship construction and repair sheds dotted around the Valukoja district of Tallinn still boast faded Soviet insignia on their external walls, harking back to the days of the old 'Eastern bloc', the land they stand on is now considered prime real estate and eyed hungrily by entrepreneurial tech specialists.

Valukoja also hosts the Technopolis business park, which is becoming a thriving hub for software and app developers drawn from both

Estonia at a glance

Figures released by Eurostat in 2015 credit Estonia's marine sector with generating €60 million (US\$70.2 million) worth of business, making it the fastest growing industry in the country. According to Eurostat, the combined production value of Estonia's workboat and OSV output amounted to €43.7 million – by far outpacing its Lithuanian and Latvian neighbours, not to mention Sweden, whose workboat/OSV sector was rated €8.2 million. The total value of Estonia's pleasure/**recreational boat production (including fittings) was recorded as €15.3 million**, leaving it on par with Sweden in respect of those vessel types.

According to the EC's Blue Growth Study, meanwhile, which was conducted in 2010, Estonia's combined shipbuilding and ship repair activities were valued at €1.22 billion (US\$1.44 billion). Approximately 75% of this total was credited to BLRT Grupp, which presides over the Russo-Baltic Shipbuilding Yard in Tallinn – but, the SCC points out, even with BLRT removed, this still grants Estonian builders and repair yards a value of approximately €300 million – and places the country ahead of Finland (€240 million), Sweden (€229 million) and Denmark (€210 million). By way of contrast, the EC recorded Germany's build/repair sectors as being worth €500 million and Poland's as being worth €684 million in the same period.

Estonia and abroad, subsequently injecting a new lease of life into this predominantly industrial area. If you insist on considering Estonia a part of 'Eastern Europe', it's a far cry from the drab, grey, communist-controlled environment that the phrase may evoke in readers of a certain age. If anything, Tallinn resembles more a European 'Silicon Valley', albeit with fresher air.

Attractive prospects

Estonia's prospects for 'brain gain' are also good. As we drove through Tallinn, Urve Nõgu, partner relations manager of the SCC – and a former estate marketing manager – explained that a modest three-bed flat in some of the cheaper areas of Tallinn should cost approximately €100,000 (just under US\$115,500). Considering that the average price for a house in England and Wales currently stands at the £300,000 mark (or US\$389,000), a career in the country's marine sector could be very attractive to younger naval architects and marine engineers who have become thoroughly disillusioned with the UK / Western European housing markets.

Similarly, Anni Hartikainen, head of the SCC, points out that it is fairly straightforward to establish a company in Estonia "within hours", and without incurring profit tax. Winters may be

Name switch to reflect maritime sector diversity

Ship & Boat International's May 2017 visit to Estonia coincided with the Association of Estonian Boatyards' decision to rebrand itself as the Association of Estonian Marine Industries.

Formed in 1997 on the island of Saaremaa, one of the country's historic boatbuilding hubs, the association originally began life as a small grouping of boatbuilders, primarily dedicated to the production of wooden craft. In 2009, after a period of expansion – and having managed to attract a wide array of marine businesses – the group adopted the mantle of the Association of Estonian Boatyards. By that stage, the association had come to represent not only the majority of domestic small boatbuilders, but also an increasing number of subcontractors.

Consequently, this year's name change aims to reduce some of the perceived barriers to membership, and to provide an umbrella for a larger association capable of representing Estonian maritime companies' interests both domestically and worldwide.

Kristijan Tabri, who has been appointed to the board of the Association of Estonian Marine Industries, and who serves as naval architect at MEC (see pages 54-55), commented: "A considerable volume of equipment and structures for the offshore and marine industries are produced here...and the sectors associated with shipbuilding and boatbuilding are well developed – product development is increasing locally." Other newly appointed board members include Anni Hartikainen, head of the Small Craft Competence Centre (SCC), and Peeter Säask, chief executive of Saare Yachts.

harsher than is the case in the UK, but these are compensated for by six state universities, comparatively cheap bars and restaurants and a plethora of islands on which to holiday or

spend the weekend. And, with good transport links to the rest of the continent, Estonia has all the makings of a significant and cost-competitive European marine hub. *SBI*



A meeting of the Association of Estonian Marine Industries, a collaboration dedicated to promoting Estonia's boatbuilding, offshore and marine engineering businesses

Competence boost

Tallinn University of Technology's Small Craft Competence Centre (SCC) is ensuring that maritime-related courses remain high on the agenda

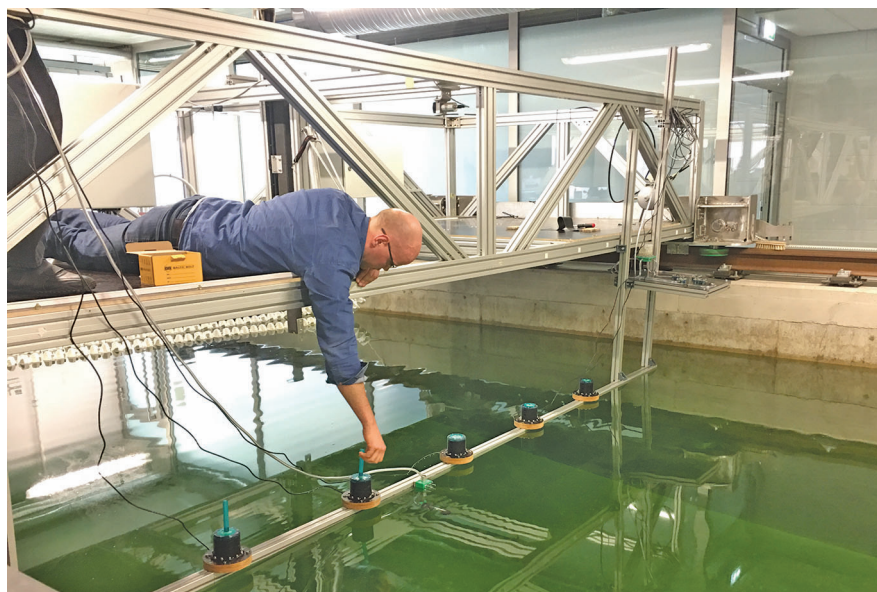
Just as many of Estonia's boatyards and marine engineering firms have experienced an upswing in recent years, so too has the Tallinn University of Technology (TTU), particularly in its ability to offer comprehensive, top-quality education and training to tomorrow's boatbuilders and architects.

The TTU occupies an important role in the country's marine sector: as the only Estonian university equipped and qualified for engineering courses, it was the natural choice of establishment for the roll-out of a maritime curriculum. The TTU grants domestic students the opportunity to sign up for small craft building courses: additionally, as part of a joint programme with Aalto University in Finland, the TTU can offer naval architecture courses.

In 2016, the TTU's Kuressaare facility, located on the island of Saaremaa, formally launched the Small Craft Competence Centre (SCC) as a focal hub for its maritime-related programmes. Anni Hartikainen, head of the SCC, recalls: "The TTU commenced its maritime curriculum in 2010, partly inspired by the need to get to grips with the EU Recreational Craft Directive, but mainly to respond to the local yards' growing need for skilled engineers. In its first year, the course attracted just over 20 students. Since then, our courses have been attended by more than 200 students, ranging from one-year courses to 4.5-year-long diplomas."

Convenient courses

The TTU moved to its current Saaremaa site in 2014, as it lacked the space to install a test basin at its previous location, just 200m away. Spanning nearly 4,000m², the new site aims to train up its students in all aspects of boatbuilding, including composites and construction materials, across a wide range of vessel types. The TTU also boasts a thriving biorobotics department, which is proving a very useful contact for the SCC when it comes to developing ROV- and AUV-related programmes and studies.



The 60m x 5m x 3m test basin at the SCC's Saaremaa facility enables users to analyse resistance and seakeeping behaviour

The SCC's income is derived partly from EU funding and partly from its ability to offer R&D and testing services for commercial projects: for instance, the site's test basin has been utilised by Baltic Workboats in developing new craft concepts, as well as by Estonian wave energy solutions start-up Lainergy, which, this year, intends to commence testing of a 1:3 scale model of an intended wave energy capture device.

The courses are arranged so as to be convenient as possible for students. As the island of Saaremaa boasts the highest concentration of Estonian boatbuilders, these local yards benefit from the arrangement of the courses, which allow students to study and work simultaneously.

Hartikainen explains: "Our students mainly come from the mainland and several of Estonia's islands, and include

several mature students. We run the course on the basis of one week per month: this means that students can work for three weeks, then stay at Saaremaa for a week, giving them a good opportunity to have regular, hands-on practice. This is important as technology is changing so fast.” To keep up to date with the most modern techniques and practices, guest lecturers and speakers are flown in from countries such as the UK, Finland, Sweden and Croatia, and enrolment on an SCC course also grants Estonian students the chance to undertake exchange visits to other international, maritime-specialising establishments, such as the UK’s University of Southampton, Germany’s Kiel University and Croatia’s University of Zagreb.

Site resources

Resources at the SCC include a 3D printing machine, a 5-axis milling machine and the aforementioned test basin, which was built according to concept and design by

MEC. The development and construction process involved more than 30 experts and specialists.

The test basin measures 60m x 5m and features a depth of 3m, and is equipped with wave generators, enabling students and staff to analyse resistance and seakeeping behaviour – not only for boats and vessels, but for other seagoing machinery. For example, the basin facilitates underwater trials for a robotic turtle, the U-CAT, which has been deployed on a number of subsea trawls, including the inspection of shipwrecks, and which can be used in conjunction with the test basin to simulate factors relevant to ROVs and AUVs.

In addition, SCC boasts material research and development facilities, allowing users to simulate different global environments and enabling testers to ‘age’ certain composites and materials, to check their long-term viability within a marine environment.

The test basin has benefited the SCC and its students in pursuing a wide range of projects, Hartikainen reveals. These include

an ongoing study into different spray rail designs for high-speed craft, as well as a recently completed paper assessing the feasibility of using environmentally friendly composite materials to fabricate autonomous surface vessels (ASVs), in order to make this technology as green as possible (*Ship & Boat International* will run the latter paper in our November/December 2017 issue).

Further expansion could be on the cards, Hartikainen hints: there is a fair amount of open space directly behind the test basin hall, which would enable the basin to be extended to a length of 90m. “This would mean we can also offer seakeeping simulations for a wider range of vessels,” she says, explaining that the move would not only increase the SCC’s opportunities for commercial test contracts, but also provide students with extra scope for larger boat development. This could be of particular value given recent trends for increased vessel lengths within both the yacht/superyacht and offshore wind farm support vessel sectors. **SBI**

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Supporting role

From providing expert analysis of vessel components and offshore structures to designing its own vessels, MEC's influence can be felt across much of Estonia's marine sector

Celebrating its 15th anniversary this year, Tallinn-headquartered naval architect and engineering consultancy Marine Engineering and Consulting (MEC) has played a key role in a number of Estonian marine and offshore projects, from the creation of test basins to the development of brand new vessel types.

MEC was established by Kristjan Tabri, Meelis Mäesalu and Hendrik Naar, native Estonians who met while they were at university in Finland, and who decided to transfer their knowledge back home. The company is currently situated at the Technopol building, a property owned by Tallinn University of Technology, and, since 2002, has grown into a team of 12 engineers, not including admin and other office staff.

Tabri tells *Ship & Boat International* that, in addition to specialising in naval architecture, MEC typically "oversees the whole conceptual design and testing process, including structural design and hydrostatic and dynamic analysis", as well as assisting vessel conversion projects and undertaking "multi-material analysis for vessels and offshore structures". These include floating production storage and offloading (FPSO) units, for which MEC particularly specialises in turret and moon pool area design and analysis. In this field, design house Deltamarin and its offshore clients have become long-standing MEC customers.

Varying jobs

The company's services also encompass vibration analysis, helideck assessments, crashworthiness analysis, stability assessments and explosion load calculations. As Tabri explains, the group may one month find itself assisting local boatbuilder Baltic Workboats in analysing and reducing slamming aboard its high-speed craft; the next month, MEC could be busy assisting a Lithuanian ferry with the design and analysis of car and harbour ramps, or even assisting with the design of lifting devices, davits and other safety equipment.

And, while MEC's name may not always make the headlines, the group has had notable input on a number of products and

projects that have captured the attention of the maritime press. Take, for instance, Danish LSA manufacturer Viking's 81m oil rig evacuation chute, credited as being the world's tallest offshore escape chute to date. This vital offshore safety system, designed to evacuate up to 146 rig workers within 10 minutes, underwent numerical testing with MEC to ensure that it remained functional after explosion loads and avoided contact with the platform while launching in heavy weather conditions. "Due to its size, the system cannot be tested before the final installation and, instead, numerical simulations had to confirm the functionality of the system," says Tabri.

MEC has also provided support for domestic developments, having designed and built the 60m x 5m x 3m towing basin – and its accompanying wave dampener and bank of wave generators – that currently occupies the SCC's testing facility at Tallinn University of Technology. The consultancy also provided the design and equipment for the pool area in Reval Marine & Offshore Training's centre.

Vessel concepts

The group's Technopol office houses a wide array of software solutions, including: Siemens' NX and Autodesk's Inventor suites, for detailed 3D modelling; Autodesk's AutoCAD and Dassault's DraftSight solutions, for completing drawings; Siemens' finite element analysis (FEA) tool, FEMAP; Siemens' NX Nastran package, which MEC uses for linear and non-linear static and dynamic analysis; and Livermore's LS-Dyna solution, an FEA solver for non-linear analysis, such as blast collision and grounding.

The group also deploys FormSys' Maxsurf and Hydromax packages for hydrostatic assessments and stability analysis. The developer's Hullspeed suite helps to predict resistance, speed and overall vessel power, while its Workshop solution is mainly used by MEC to estimate the weight for preliminary steel vessel designs.

All of which has proven very useful for MEC's newbuilds and new vessel concepts.

In 2009, Estonia's Reval Shipbuilding launched the passenger ferry *Koidula*, a 32m x 8.5m vessel with the capacity to carry up to 50 passengers and four cars, servicing the shallow-water environment of Lake Peipus. MEC helped to arrange classification for this vessel, as well as providing her work drawings and stability analysis, and designing her onboard systems.

In 2013, the group was contracted to provide similar services for a Reval-built, 75-passenger ice-class ferry, *Wrango*: this 24.6m x 6m vessel has been providing services between Estonia and the island of Prangli, in the Gulf of Finland, ever since. However, MEC has also extended its design expertise to other vessel types, including an 11.1m x 5.1m oil skimmer craft, launched in 2015.

MEC also has two 24m-long concept vessels on the drawing board: the first a luxury motoryacht, designed to accommodate six people; the second a high-speed catamaran ferry, also sized 24m but with the capacity to carry 60 passengers and intended for operations in and around Estonia's cluster of islands. "The 60-pax cat has been designed to operate safely in wave heights of up to 2.5m Hs," says Tabri. "It is still at the concept stage, but would be beneficial to tourists as a less expensive means of travelling between the islands, compared to helicopter trips."

From subs to Leanships

Perhaps one of MEC's more notable and unusual domestic projects, however, was the positioning of the WW2-era submarine *Lembit* in Tallinn's Lennusadam (or Seaplane Harbour). This 60m x 7.5m vessel, with a 3.6m draught, was originally built in 1936 for the Republic of Estonia and later also served the Soviet Baltic Fleet until 1946, after which she was redeployed as a training boat. MEC developed the plan to winch the submarine from the water, as well as providing the land transportation and positioning of the submarine within Lennusadam as a permanent museum piece

– a feat achieved with approximately 750m of wire and 200 tonnes of winching force.

Looking ahead, Tabri reveals that MEC will work alongside major European shipyards and research institutions as part of the EU's Horizon 2020-affiliated LeanShips project,

to develop a novel decision support system for energy monitoring and optimisation for Tallink's 193m loa ferry *Victoria I*. The system is partly running since 2015 and already shows remarkable savings in fuel consumption.

Growth may also be on the cards, Tabri adds, though he does identify one current stumbling block for Estonia's marine sector. "We need much more CFD knowledge in the marine field," he opines. "This is one area where we need to recruit more qualified people." *SBI*

Tips for newcomers

Sulev Alajõe, regional investment advisor at the Estonian Investment Agency, a government agency dedicated to pursuing foreign investment in Estonia, offers some tips for those who may be keen to establish a presence within the country:

"Companies considering relocation to, or expansion into, the Baltic Sea region have found Estonia's economic ecosystem simple and transparent. For example, profit used for reinvestments is not taxed.

"Market-wise, our location is a good base with competitive production costs relative to the Swedish and Finnish markets, those also being wealthy maritime societies. Small craft construction is our key sector, revealing the best of Estonia's fondness for innovation, as well as our flexibility and the quality of our work. Our island's history of shipbuilding has spilled over to various businesses and side-sectors, providing the advantage of offering subcontracting and partnering deals to newcomers. Customers have found Estonian products and services reliable, and with stable quality standards.

"The Estonian Investment Agency helps investors with free soft-landing services, such as location search, company foundation, grant information, partner supply, HR contacts, etc. All companies, no matter of their country of origin, are entitled to export services. For instance, Estonia provides always-discounted participation costs on main maritime fairs in Germany."



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Rate of inflation

The previous four years have seen Tornimäe-based Alunaut grow its boatbuilding business to include a new series of RIB concepts, developed for private and commercial owners alike

Established in 2008, boatbuilder Alunaut has grown from a “small subcontracting yard” into a supplier of aluminium boats and RIBs for customers including the Finnish Navy, Latvian Police, German Red Cross (Deutsches Rotes Kreuz) and the Port of Tallinn, among others.

Although the company is relatively young, Mark Muru, chief executive, explains that it is far from lacking in experience. A veteran of the Finnish boatbuilding sector between 1990 and 1994, Muru spent the latter half of the 1990s employed by the Estonian Maritime Administration, where he was charged with “taking care of pilot boats, and building new ones in a state-owned yard”.

In 2000, he joined Baltic Workboats, where he served until 2007, before forming Alunaut in the following year. “Originally, Alunaut intended to build trailerable aluminium boats for the private sector, or small workboats,” Muru recalls. “At this time, we were building boats for three different Swedish yards...we still have a cooperation with [Swedish builder] Vector ProBoat.”

In 2012, Alunaut built a new factory near to Tornimäe, in western Estonia. Although this site does not directly access the coastline, Muru explains: “It is no problem for us, as most of our boats are trailerable, using 4WD cars.” Larger vessels are typically taken by truck, via bridge, to the Kuivastu Marina on the island of Muhu, which has a draught of approximately 5.2m and can accommodate vessels of up to 120m. For overseas deliveries, meanwhile, the company will typically pilot the boat to the customer – an arrangement that is “the most fun, of course!” says Muru.

Aluminium series

In 2013, Alunaut developed its first boat class, the Alunaut A8 CC. This aluminium boat type measures 9.2m x 2.7m, weighs approximately 1.75tonnes and can accommodate six persons. The A8 CC can be powered by either a single outboard or dual outboards, with a maximum capacity of twin 186kW engines. When using a sole Suzuki DF300, the A8 CC managed to record speeds in excess of 40knots whilst travelling at 224kW.

This model was followed by a wheelhouse-equipped version, the A8 WH. Measuring 8m x 2.8m and capable of handling a maximum engine power of 222kW, the A8 WH also houses six people and can generate the same speeds using the same sole engine.

Meanwhile, recognising a niche gap for private users engaged in less demanding tasks and seeking cost-effective solutions, Alunaut rolled out the AC series of boats, ranging from the 3.9m x 1.6m, three-man AC-12, which features a maximum power capacity of 7.3kW, to the 4.9m x 2m, five-man AC-16, which features a top power capacity of 44kW. All of the boat types offered by Alunaut are built with sectioned hulls.

Birth of the A8

Then, in 2014, Alunaut commenced work on its first RIB newbuilds. “There was a group of people who’d seen and tested our A8 hull in pretty rough conditions and they planned to purchase a new RIB for their work,” says Muru. “So they called me and asked if we could build a RIB, based on exactly the same hull that we had for our hard-shell boats. That’s how the A8 RIB was born.”

Alunaut’s A8 RIB model, launched in 2014, can handle up to 368kW of engine power



The A8 RIB concept sports a length of 8.2m, a 3.1m beam and a depth of 0.4m, and has the capability to handle up to 368kW of power. Weighing roughly 2tonnes, the A8 RIB, like its aluminium-shell counterparts, can hit speeds in excess of 40knots when going flat-out with a Suzuki DF300 (the engine recommended by Alunaut) at 224kW.

Unlike her hard-body relatives, however, the A8 RIB is certified to carry 12 persons under the EU Recreational Craft Directive (RCD), making her ideal for a range of tasks, including naval and coast guard patrol/SAR work and offshore crew transfer. “She can take more persons,” says Muru, “but of course, if we design the A8 for more than 12 persons, we would also need to go with class rules.” Customers can select between open-top and wheelhouse-fitted versions, and inside free space is just over 2m in width.

Such was the industry feedback on the A8 RIB, Muru recalls, that Alunaut undertook the “logical follow-up” of developing the craft concept in a variety of different sizes, including the smaller A7 and A6 RIB versions. Muru comments: “All our RIBs have 1,500g/m² heavy-duty Hypalon tubes, over aluminium hulls. The A8 and A7 RIBs both have fully automatic Zipwake or Volvo Penta Boat Trim Systems [BTS] as standard equipment – and both models are considered to be ‘base boats’, so can be customised for any client to fit for the mission-specific tasks they need to undertake on water.”

Another possibility, for military and police clients, is to reinforce the RIB design with ballistics protection. And,



The company's A8 CC aluminium boat provided the inspiration for the development of the A8 RIB

just as Alunaut's motorboats are built with sectioned hulls, so the company's RIBs feature sectioned tubes.

Expanding the range

To date, only one full-width version of the A8 RIB has been launched and delivered – a harbourmaster's boat for the Port of Tallinn, which is being used to assist megayachts calling at the marina, as well as to collect marina user fees on water, a few miles away from the facility. Muru explains: “All the rest of our customers have been asking for a similar model but with a maximum full beam of 2.5m. The reason for this is the rules for road transport: the boats need to be mobile and trailerable, and trailering anything wider than 2.5m is not so simple in the EU.”

Further growth would appear to be on the cards – both figuratively and literally.

As the company approaches its 10th anniversary, Muru is pleased to note: “The staff has been growing: we started with a total of five people and, today, there are 21 of us.” He adds: “Alunaut now has three main directions: developing and marketing our own boats; subcontracting to other yards; and building one-off workboats.”

The company has also drawn up preliminary designs for A10 and A12 RIBs – which, as their monikers suggest, would feature overall lengths of approximately 10m and 12m respectively – as well as smaller 4m and 5m models. “I believe, with these sizes, we could go with PVC tubing for private users and Hypalon tubing for commercial/workboat applications,” Muru says. “We're just waiting for the opportunity for these to be born and launched.” **SBI**

Adventures in aluminium

A consistent pool of talented, young boatbuilding experts is helping Norway's AluVenture to grow its aluminium recreational craft business from its facility on the island of Saaremaa

Headquartered in Norway, aluminium boat designer and builder AluVenture is one of a growing number of foreign companies to have selected Estonia as a boat-manufacturing base. Reflecting

on this choice of location, Jako Kaups, who co-founded AluVenture in 2015 in cooperation with business partner Stian Bakken, tells *Ship & Boat International*: “There were many reasons why we decided to produce these boats in

Estonia: cost was one of them, but access to talented employees was also a big reason. It is hard to find such talented builders in Norway, as the few who still pursue a career in shipbuilding are employed by the other boatbuilders,

which means we need to bid talent away from our competitors.”

In contrast, he adds, the town of Kuressaare, situated on the Estonian island of Saaremaa – which is currently home to the Eysysla Yard OÜ facility, also co-founded by Bakken and Kaups, and the yard in which AluVenture produces its range of AluVenture 6500 boats – has offered the company far greater flexibility when selecting qualified personnel.

Kaups continues: “Kuressaare has a long and proud history of boatbuilding and has a talent pool of boatbuilders that is constantly being refilled with young, skilled graduates from the local marine university.”

Thriving facility

Kaups reveals that, while AluVenture may be a fairly new group, the idea for the company was one that he and Bakken had “nurtured for many years prior”. Even so, AluVenture has grown notably since its inception – “We have already had to increase the number of square metres we occupy within Eysysla Yard,” he says, adding that there is plenty more potential space at this premises which AluVenture can utilise as the company grows.

For example, the yard hosts: a workshop, offering approximately 700m² of space; a 3.5tonne SWL crane; six welding machines; and various, smaller metal-forming / -cutting tools. The facility currently employs a manager, a naval architect and between six and 10 welders, depending on demand.

AluVenture also relies on long-standing subcontractors Alumeco, a Danish supplier of aluminium, and Dutch laser-cutting specialist Snijtech to take care of material cutting and bending. Kaups continues: “All details are laser-cut and exact by mm. After receiving the material, we weld the details together in our workshop and, after finishing the metal work, we sand-blast the boat and paint it with multiple layers of marine-grade epoxy paint.”

Rugged build

It is in these surroundings that the group has produced its AluVenture 6500 range of aluminium craft. Kaups explains: “The target buyer we had in mind when designing



The AluVenture 6500 craft was originally intended for private owners, though its sturdy nature has attracted the interest of police, coast guard and naval customers

the 6500 series is a private individual who wants the convenience of an aluminium boat and the feel of an extremely seaworthy vessel.” As such, the 6500 could be viewed as a ‘Land Rover’-style application – “a capable car with attitude”, as Kaups puts it – ideal for choppy waters and harsh terrain when undertaking recreational activities such as sports fishing and diving, for instance. It is perhaps testament to the 6500’s sturdiness that the boat type has also attracted the interest of various police and harbour patrol agencies, coast guards and military clients.

AluVenture also sees aluminium as a natural material for such activities. As a lightweight alternative to steel and GRP, the owner can not only achieve higher speeds whilst reducing fuel consumption, but may also find it easier to transport the boat by road to remote, shallow-water locations. The rugged nature of the material also makes it suitable for operations in Nordic and Baltic waters, where rocky crags and shallow seas are commonplace.

The 6500 features a length and breadth of 6.5m x 2.32m overall, with a depth of 2.9m and a draught of 0.36m when fully laden (excluding the engine) – the latter feature making it extremely easy to launch from shallow-water and confined areas. The vessel type weighs just over 1tonne when empty, increasing to a full load of 2.18tonnes.

Designed for a six-man crew, the 6500 is compatible with most outboards and capable of handling a power range spanning 67-150kW per engine. This is sufficient to enable speeds of up to 40knots. Despite

the vessel’s compact size, a fuel capacity of 214litres also gives the boat a decent range.

Kaups explains: “Our first 6500 came only with a centre console [CC] as a solution.” This incorporates a high-bow, polycarbonate windscreen to shield the coxswain and crew from spray, rain and harsh winds. In addition to the 6500 CC, AluVenture can create a customised 6500 Patrol version, featuring an enclosed wheelhouse with all-round visibility and fitted with relevant navigational equipment. Kaups adds: “We are now developing a closed-cabin solution with one bed on the same hull – especially with the trolling community in mind.”

Bigger to come

Market demand for bigger recreational boats, meanwhile, has spurred AluVenture to develop a larger model, dubbed the 11000 series. This “beast”, as Kaups puts it, would extend the design’s length to 11m and offer the option for three outboards, effectively enabling a top speed of approximately 55knots. Provisional layout plans for the 11000 include a closed centre cabin, two beds and a flybridge, with the capacity to carry up to eight people.

And the size variations don’t end there. “Our intention right now is to add one or two additional series in between our 6500 and 11000 series in the future,” Kaups hints. This could take the form of AluVenture’s 7500 or 8500 concepts – extended versions of the 6500 that would feature lengths of 7.5m and 8.5m respectively, and which the company drew up at the time of its inception as possible solutions – or, indeed, an entirely new concept. **SBI**

The art of survival

A tailor-made facility, fresh feedback from experts in the field and increased forays into the offshore sector have helped Estonia's leading maritime training centre, Reval Marine & Offshore Training, to expand its global customer base

Until relatively recently, anybody seeking OPITO-approved maritime training, to enable them to start a career in the offshore oil and gas or wind sectors, would have found few suitable resources in Estonia. For the majority of would-be offshore personnel in the Baltic states, the most viable option would have been to travel to Denmark, Germany or the Netherlands, thus incurring travel and accommodation costs on top of the expense of the training itself.

This all changed in 2015, when Estonia's leading maritime training centre, Reval Marine & Offshore Training, added OPITO-approved training to its roster of courses. The move has proven a popular one, and not just within Reval's backyard: as general manager Tanel Hinno explains: "We now have a number of customers from the Philippines and Australia and we train seafarers from almost every country in Europe, as well as from Africa." In addition to offshore trainees, regular visitors to Reval include members of the Latvian Air Force and Latvian Special Tasks Unit, students from Tallinn Technical University and the Estonian Maritime School, professional land- and sea-based rescuers (including voluntary organisations and Tallinn's airport rescue service) and law enforcement and military clients, Hinno reveals.

And the group's offshore prowess does not end with the OPITO courses. In May this year, Reval's Tallinn-based facility became the first Estonian marine training site to be granted certification to conduct Global Wind Organization (GWO)-approved courses – thereby providing a cost-competitive alternative to wind turbine technician courses offered in Scandinavia and Western Europe.

Fresh content

Reval was founded in 1989 and its facility commenced operations in 1996. Captain Aivo Palm, senior advisor at Reval, adds: "We're the only maritime training institution

in Estonia that has managed to maintain operational stability as an independent company. It's very important for us to remain independent, so we can develop our range of services as much as possible."

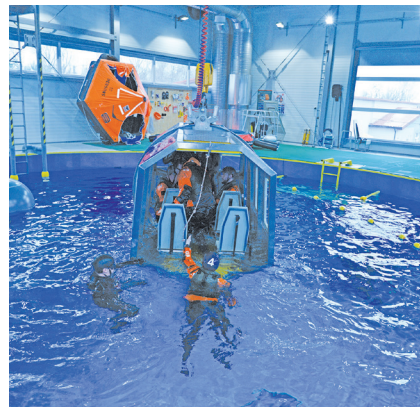
Seafarers and offshore workers can undertake a wide range of courses at Reval, ranging from basic Standards of Training, Certification and Watchkeeping (STCW) courses to helicopter evacuation familiarisation. The facility currently employs 45 people in total: approximately 25 of these work full-time, with the remaining part-timers "mostly working at sea, and drawing on the skills they practice in daily life to instruct others," Palm says.

Hinno adds: "We want to keep our training updated and fresh...not taught in isolation from real life. You can always read existing manuals, but things are constantly changing. If you can bring some fresh knowledge into the classroom, directly from the field, that's always an advantage." As such, Reval prides itself on having developed a tailor-made facility, designed to replicate "as realistic a marine environment as possible", he says.

Authentic simulations

Outdoors, for example, the centre houses a fire shed, which can be used to simulate galley fires. This frighteningly accurate installation provides a realistic taste of how quickly a blaze can spread within a confined-space environment – and, with the capability to reach a temperature of 250°C, is clearly not to be approached lightly. However, should trainees later encounter a 'real-life' onboard fire, such training could prove vital in reducing their chances of injury or death, granting them a powerful psychological edge when responding to the situation.

Similarly, Reval's indoor pool area has been designed to realistically simulate a number of maritime emergency scenarios across various sea states and weather conditions. The pool itself measures



Reval Marine & Offshore Training's facility in Tallinn has been certified to undertake both OPITO- and GWO-approved training

12.5m in diameter and features an overall depth of 4m, and a water depth of 3.5m – easily replenished during training by a 420tonne-capacity storage tank. Screens can be pulled down over the windows to simulate night-time conditions, while wind generators are capable of creating wind speeds of up to 20m per second, or 40knots.

A wave ball with a vertical range of 800mm enables the trainers to generate various wave heights, up to 0.8m max, and sprinklers can even simulate rain conditions – providing all the ingredients for an authentic dose of marine/offshore conditions. The pool facility also houses: three evacuation systems; liferafts and a rescue boat; a rescue net; a 3tonne SWL crane and 125kg auxiliary crane; and a mock-up helicopter nacelle, typically dropped into the pool, upside-down, with a complement of 'passengers', for evacuation training. "The helicopter winch is a real one, taken from an old Russian Mi-8 helicopter, so it's a very realistic exercise!" says Palm.

Most of the pool area's layout was developed in cooperation with MEC (see pages 54-55), with which the training specialist has enjoyed a longstanding relationship. Reval also credits class society Lloyd's Register with having provided

advisory support at the stage of developing new courses and keeping abreast of current regulatory requirements – a bonus that also helped the facility to increase its international appeal. *SBI*

The pool at Reval's Tallinn facility features a water depth of 3.5m and the ability to create waves of up to 0.8m in height



Brains behind the brands

E-Profiil and Deck Engineering are both providing customised and innovative solutions for the marine and offshore sectors

For many outside Estonia, the name E-Profiil may not be instantly recognisable – though the company's thumbprint can be found on all manner of marine and offshore installations and components, around the globe. "We're a 100% subcontractor – a one-stop shop for heavy industries," explains Kristjan Kõrgesaar, sales representative at E-Profiil. The company, however, which sees itself as working across the entire value chain, from engineering to prototyping, manufacturing, testing, installation and aftercare, has been involved in the development of a number of 'big name' products on the market, including the shipboard and offshore cranes and components produced by MacGregor, National Oilwell Varco and Kenz Figee. ABB is another long-term E-Profiil customer, Kõrgesaar explains. "We help to fabricate ABB's azimuth thrusters and propulsion systems," he says.

Established in 1997, E-Profiil oversees a workshop in Tallinn and a more recently acquired facility in the port of Paldiski, situated approximately 45km west of Tallinn. The company has a workforce of 250 employees and an annual turnover of approximately €20-25 million (US\$24-29 million), despite "tepid" activity in the offshore market over the past few years, Kõrgesaar claims.

While this market downturn may have affected E-Profiil's offshore work, it has also inspired the group to pursue the goal of being a "one-stop shop" for marine and offshore interests, especially regarding anything to do

with steel structures and components. "Our business is still about steelwork," he adds. "We've handled one-off projects involving composites, but the mass demand isn't there yet." The permanent subsea market is also a potential target for new business, he reveals.

Facilities and equipment include a 6,000 metric tonne-capacity crane test stand, with 2,000tonnes skidding capacity and 300tonnes lifting capacity, and access to 12m-deep water at the quayside.

Specialist equipment

E-Profiil is situated doors away from its sister company, Deck Engineering, which specialises in the design and manufacture of equipment for the oil and gas and marine sectors. The two companies are part of the parent company Technobalt Holding, whose subsidiaries also include fabrication and machine-building companies Metre and TB Works, engineering and waste-handling group Technobalt Eesti and survey specialist Servtec Solutions. Approximately 50% of the parent company's €65 million turnover is derived from the marine and offshore sectors.

Dmitri Jekimov, general manager at Deck Engineering, tells *Ship & Boat International*: "We're not interested in producing off-the-shelf solutions: we still see ourselves as a small company, in the global context. We don't have ambitions to build factories in China, but see our niche as producing specialist equipment. If the customer wants a solution built for a specific purpose, capable of operating within certain temperatures – or sea states – this is where we step in."

The company, which is ISO 9001:2008(DNV)-certified, has landed an impressive number of contracts, predominantly in the offshore sector, over the past 12 months, Jekimov adds. These have truly added credence to Deck Engineering's claims to be a "multi-disciplinary" company: for instance, one contract saw the group agree to undertake testing of a 900tonne-capacity crane hook. Taking into account the proof test load of x1.25, this led to Deck Engineering lifting a total load of 1,120tonnes on a specially constructed frame in its Tallinn workshop.

However, the company has also involved itself in conducting fatigue life analysis for, and replacement design of, a V-door aboard an offshore rig. This job was conducted by a Norwegian partner at a shipyard in South Korea, where the platform was undergoing modifications.

Deck Engineering has also developed what it terms "an umbilical injection and deployment wheel and reel" for the offshore sector, to be used for deploying subsea cutting tools for well decommissioning projects. The reel, Jekimov explains, is a "modular hydraulic reel", which is fairly unique in that it boasts removable spool drums, for increased flexibility in the field and ease of maintenance. "The main design can be customised for several drums and different umbilical shapes," he adds. Energy major ConocoPhillips subjected the wheel to tests last year, and Deck Engineering has also cooperated with American and Norwegian partners on the development of this project. *SBI*

The full works

Orders are on an upwards curve for Baltic Workboats, which has produced more than 165 vessels for international markets over the past 17 years

As a rule, 50th anniversaries tend to be special occasions, but even more so when business is booming and orders are on an upwards curve. That's the fortunate situation Baltic Workboats finds itself in, as a trip to the company's building facility, on the island of Saaremaa, attests.

Baltic Workboats' 5,500m² yard is flanked by wind turbines: the company took the decision to 'go green' a couple of years ago, and currently draws on 10% of the energy generated by these turbines – in combination with roof-mounted solar panels – to run all of its vessel construction operations (the remaining energy is sold to Estonian power companies, thus granting Baltic Workboats a welcome, additional side-line in revenue). The design office has grown rapidly over the past few years, with 40 naval architects now working in the Baltic Workboats' Tallinn and Saaremaa offices. "Most of our naval architects are from Estonia and Finland, but we also have personnel from Sweden, Russia, the UK and even Asia," Joel Rang, sales and marketing manager, explains.

The facility has been through a lot of redevelopment in the past five years, including investment in CNC and laser-cutting technology and the creation of a new slipway, the latter featuring a capacity of 850tonnes and offering a 4.5m draught. This complements the yard's existing, 150tonnes-capacity slipway. The site can build vessels of up to 100m in length (a capacity which the yard recently exploited, as we shall see), all of steel and/or aluminium fabrication, and has produced more than 165 vessels at the time of going to press. Certification includes ISO 9001: 2008 (DNV) and ISO 14001:2004 (DNV).

Strong order book

As regular readers may be aware, Baltic Workboats specialises in patrol and rescue boats, pilot craft, workboats and crew transfer vessels (CTVs). However, the yard is also increasingly becoming a noted producer of research and survey vessels, fast ferries, tugs and offshore wind farm support vessels, with clients ranging from Bulgaria's Border Police to the American Pilots' Association.



Kihnu Virve, one of the trio of 200-pax, 45m ice-breaking ferries built by Baltic Workboats for the Estonian Maritime Administration

Rang says: "Currently, the order book has been quite strong due to our state-of-the-art, proven wave-piercing design. We are now delivering 22 Baltic Workboats wave-piercing designed boats, ranging from 15-45m."

"About 90% of the vessels built here are based on our own in-house designs," Rang adds. "We also class all vessels, either to classification society or local / flag state rules, even if the customers don't request it, to ensure that everything we build is of top quality."

In addition to its Saaremaa yard, the company runs a sales office on the mainland, in Tallinn, which employs 23 people.

It's all a far cry from Baltic Workboats' genesis as a repair yard in 1967, a period that lasted until a pair of domestic entrepreneurs acquired the company in 1998, before initiating a process of yard modernisation in 2000. The period of 2001-2004 saw the production of Baltic Workboats' first pilot boats (including the debut Watercat Pilot 140 class) and, in 2007, the builder launched its first 24m vessel, a patrol boat for the Latvian Naval Forces Coast Guard Service, along with five sister vessels for the Swedish Coast Guard.

2013 saw the company contracted to produce its first ever 45m newbuilds, in an order for two (later extended to three) ice-breaking, double-ended passenger ferries for the Estonian Maritime Administration. Each of these uniquely styled sisters (noted at the time for their radical lines and almost 'space age'-style appearance) featured the capacity to carry 200 passengers, 32 cars and two lorries, and was powered by a pair of 1,000kW Rolls-Royce US155 engines, delivering a service speed of 12knots. The first of the trio, *Ormsö* and *Kihnu Virve*, were delivered in 2015, with the order being completed with the handover of *Soela* in Q2 this year.

Patrol and offshore

Late 2015 also saw the delivery of the company's 15m x 4.5m wave-piercing pilot vessel *AHTO-14* to the Estonian pilot organisation Eesti Loots (see *Significant Small Ships of 2016*, pages 4-5), which managed to combine a shallow draught of approximately 0.85m with a twin-screw arrangement capable of carrying six pilots at speeds of up to 27knots.

Baltic Workboats subsequently tweaked this design, producing the vessel *AHTO-15* to

woo the offshore wind farm support market. This vessel features extended dimensions – measuring 20m x 5m – and the ability to carry up to 12 turbine technicians. A pair of Volvo Penta D16MH engines, each rated 552kW and driving fixed-pitch propellers, enables a speed of 30-31knots, with a fuel consumption rate of 220litres per hour and a range of approximately 300-400nm.

Shock-mitigating seating has been provided by NorSap and, Rang reveals, the bow thruster and rudder control buttons have been ergonomically positioned in the wheelhouse, to make it easier than before to manoeuvre the vessel. Special attention has also been paid to enhancing the view from the wheelhouse. In fact, *AHTO-15* is simple enough to operate that your editor was able to control the vessel and steer it neatly around the waters surrounding Baltic Workboats' yard.

Swedish road ferry

As mentioned before, this year also saw the delivery of Baltic Workboats' largest vessel produced to date – not to mention, the largest vessel ever completed on Saaremaa – in the form of the 100m road ferry *Neptunus*.

Designed to function as a 'floating bridge' and plug gaps in the road infrastructure in Sweden, the order was placed by Swedish traffic authority Trafikverket, requesting Baltic Workboats to deliver two sister ferries for the 2014-built, ice-going ferry *Saturnus*. Like



Baltic Workboats' 4500WP class of patrol boat was developed to conquer the harshest of marine conditions

Saturnus, *Neptunus* features a length of 100m, a beam of 18m and a depth of 2.2m, and has been designed to accommodate up to 297 passengers and 80 cars.

Neptunus also features a maximum load capacity of 600tonnes, and has been designed to be fully compliant with Finnish-Swedish Ice Class Rule 1B, which recognises a ship's ability to maintain a minimum speed of 5knots whilst navigating in a channel of up to 800mm of brash ice.

As part of the contract, Baltic Workboats expanded on *Saturnus*' design by equipping *Neptunus* with the builder's own developed shipside monitoring system, thus providing "easier to read" engine data and ballast information within the wheelhouse, Rang says. *Neptunus* was handed over to Trafikverket in July. Baltic Workboats has now executed the second option for a sister vessel featuring a hybrid propulsion battery pack, to be delivered in 2019.

Multipurpose patrol boat

However, this isn't the only Baltic Workboats product to increase in size. The company's latest design – and one that could cause some shake-ups in the coast guard, police and naval sectors – is the 4500 Wave-Piercing (4500WP) multipurpose patrol boat concept, which manages to pack a 30knot punch into a 44.6m x 8.8m frame (see Technical Particulars box).

As well as featuring the power to conduct coastal patrols and interception work, the 4500WP is envisioned as being capable of

responding to fires and oil spills, undertaking hydrographic tasks and, in its quieter moments, even servicing buoys and providing support to navigational networks. The vessel has been designed for operations in harsh conditions, with the ability to cut through 100mm of ice. Other onboard equipment includes a pair of fire monitors, each rated 600m³/hr, as well as oil collection equipment and a 7m aluminium rescue boat. This vessel will be delivered in 2018.

So far, the 4500WP vessels have matched a pair of MTU 16V4000 engines, rated 2,000kW apiece, to fixed-pitch propellers, running through twin ZF gearboxes. However, Baltic Workboats has created an option for a hybrid diesel-electric version of this vessel, which would utilise two Volvo-Penta D11 gensets and a 500kW generator, thereby assisting coastal and inland users to comply with stringent rules on emissions. The company has already experimented with diesel-electric power, having developed a similar solution for its prototype Pilot 160 low-emissions, ice-going pilot boat class – a vessel measuring 16m x 5.3m, drawing 2.4m, displacing 58tonnes and capable of ploughing through up to 500mm of ice.

Having recorded a turnover of €27 million (US\$31 million) last year, Baltic Workboats is now keen to build on the success of the past 17 years with more designs and contracts. Latin America could be a potential target market, Rang hints, adding that business has grown to the extent that a facility expansion may be required, due to the increased volumes ordered by its domestic and international clients. **SBI**

TECHNICAL PARTICULARS

Baltic Workboats 4500WP

Length, oa.....	44.6m
Breadth, oa.....	8.8m
Draught, max.....	2.6m
Displacement.....	220tonnes (approx.)
Range.....	2,500nm
Speed.....	30knots
Onboard capacities	
Fuel.....	15,000litres
Fresh water.....	1,800litres
Gray water.....	1,800litres
Black water.....	1,800litres
Complement	
Crew.....	10
Passengers.....	35
Classification society.....	Lloyd's Register
Notations.....	100A1 SSC Patrol Mono/HSC G3 MCH UMS or equivalent