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STRONGER THAN EVER
THE GERMAN NAVAL INDUSTRY AND
INTERNATIONAL PARTNERS

CUTTING EDGE TECHNOLOGY FOR THE NAVIES OF THE WORLD

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Cover

The first of a total of four F 125 class frigates, constructed by a consortium consisting of thyssenkrupp Marine Systems and Fr. Lürssen Werft, was named “Baden-Württemberg” in a ceremony on 12 December 2013. (Photo courtesy thyssenkrupp Marine Systems)

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Editorial

Defending the lead

The German naval industry and its international partners contribute to maritime security by offering cutting-edge technology to the navies of the world. This Special Issue provides companies in the naval industry with the opportunity to show that they are present even in difficult times and how they can support the world’s navies now and in the future.



The German defence industry has a strong position on the world markets. But what does it take to defend the leadership despite strong competition from other European and non-European countries?

The European Union has launched several initiatives aiming at harmonising weapon systems across Europe to reduce costs and to enhance the interoperability of military forces.

In his article “Harmonisation of major naval systems across Europe – Can Europe reach a level comparable to the U.S.?” Dr Hans Christoph Atzpodien, former CEO of Blohm+Voss Shipyard and thyssenkrupp Marine Systems and since 2017 Managing Director of the Federation of German Security and Defence Industries (BDSV), examines how this could be done and what affect a so called “harmonisation” would have on the German naval industry as part of the European industry. The article is based on a talk Dr Atzpodien gave at the recent *Conference on Maritime Security and Defence (MS&D)* in Hamburg on “The European Defence Fund (EDF) - Opportunities and Options for the Naval Industry”¹⁾. He concludes “In Germany the defence industry is 100 % privately owned and must therefore sustain itself in full competition, while other European countries directly or indirectly subsidise their defence companies. In order to foster a true harmonisation of armament programmes these governments would have to give up at least part of their industrial interests in order to promote a consolidation around the strongest and fittest of Europe’s defence industry. However, due to the value of naval procurement programmes at stake and considering the size and strength of the major entities of Europe’s naval industry on a worldwide scale, it seems highly unlikely that national industrial ambitions will be reduced within a foreseeable timeframe. As of today, nobody should expect that the number of major European naval programmes will be cut to a number comparable to the U.S. by the mid-point of this century” and let me add: I am not sure that we even want this to happen. Harmonisation of naval industry in the USA has lead to a situation where the US Navy is suffering significantly from a lack of competition, which means – above other things - reduced ingenuity and monopolistic prices, dictated by the few surviving – and influential - companies.



Jan Wiedemann
Publisher and Editor-in-Chief of this Special Issue

¹⁾ The Technology Panel of the conference can be viewed under https://player.vimeo.com/external/508928959.hd.mp4?s=3e5cd59b03c5a9e0193bbc993830b2a1da718ba3&profile_id=175.

Technological Flashlight: Is there any Customer Benefit in Digitization?

“Digitize!” seems to be the buzzword of this decade, and every industry seems to be willing to follow this battle cry. But is this just a fashion being picked up, or is there tangible added value? Ideally there should be benefits both for the companies and their customers. Before writing a doctorate, let us look into practical applications. thyssenkrupp Marine Systems committed itself to digitization in mid-2020, announcing a 250 m EUR investment in its sites with the goal of turning into a fully digitized naval systems house in the next few years. Such an ambitious goal has a deep impact on internal data structures, processes, procedures and at the end on the products. For this technological flashlight we will focus on some of the less obvious building blocks of this strategy.

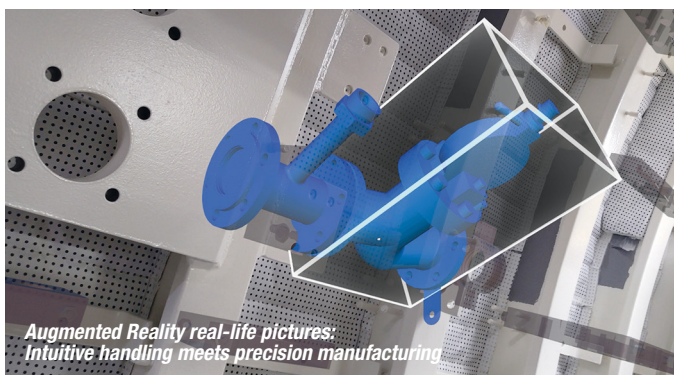
Virtual Reality Becomes a Real (and Better!) Hull

When building a submarine, precision in manufacturing has a significant impact on the later service life. Precision results in a fully symmetric hull structure. Precision results in a structure where the loads of appendages and foundations are fixed exactly where they belong. Precision thus results in more diving depth or more precisely: In higher safety margins.

Navies can thus fully exploit the technical and tactical limits of their submarines, without reservations. Precision also results in a higher packaging density. With modern ships and submarines crammed tight with high-tech, a few less than optimally managed centimetres here and there might cause a big problem. Or, managed properly, the result is a densely packed, but still user-friendly and maintainable warship. Precision then results in fighting power for our Navy operators.

This entails the need to further increase the manufacturing precision by a considerable factor, without increasing cost or time demands on the respective sub-processes. And, of course, submarines have this tricky form without any right angles...

thyssenkrupp Marine Systems already uses augmented reality systems to achieve this quality, making the markings in the hull and the placement of parts both more precise and quicker.



Augmented Reality real-life pictures:
Intuitive handling meets precision manufacturing

Digital Twin: It is what it is. Not just what it should be.

Higher precision and the forward flow of design data to the production line as well as the backward flow of the as-built data turn the Digital Twin into what it has to be in a fully-digitized naval systems house: A digital twin, something digitally identical, a representation of what actually is there. Not just an idealized picture of what should be there.

The benefits have both long-term and short-term effects. Long-term effects become visible during major overhauls or refits, when parts are to be replaced. For example: Complex components can be made exactly to size and inserted without costly and long on-site improvised adaptations. Without creating tension or flex loads that might lead to premature mechanical or electro-chemical failure modes. Cabinets for electronics upgrades can be taken straight to the right place, as the location is known exactly. This may tip the scale from an otherwise stopped project to a successful change.

ViSTIS®: Digital Twin as Training Partner

One of the short-term effects is the seamless conversion of digital twin data into training environments. On-board familiarization can be done in a virtual training environment. The functions underlying the ViSTIS system reflect the entire complexity of our know-how and a naval systems house. The high visual fidelity motivates trainees. It is simply more fun to work in an intuitive and visually tangible environment, one effect we have seen when employing ViSTIS. The high technical fidelity ensures that the training is effective, with zero unwanted negative training effects.

Being linked to the digital twin, training will keep up with configuration changes and upgrades.



ViSTIS®: High AR fidelity promotes motivation and effective training

With the Headcount Down, Make Every Head Count.

But sometimes digitization is even less high-flying and more linked to the day-to-day problems of running a naval unit. With ever smaller crews and ever more complex technology, the probability that a malfunction isn't matched with the right specialist and required knowledge level on board simply increases. Either this means more downtime, or we need a user-friendly way of getting this competence on board, quickly. Sometimes just one Navy specialist might be available to solve the problem.

The ATLAS ELEKTRONIK Remote Maintenance System is thyssenkrupp Marine Systems' in-house system of choice to help our customers, as navy-internal depot level maintainers can access the problem remotely. Remote maintainability is already a standard feature in all ATLAS systems. It will be a standard requirement for all future subsystem suppliers on thyssenkrupp Marine Systems ships and submarines.

Digitization: Only Useful if Useful to the Customers

The disruptive character of digitization often becomes apparent either in hindsight or on being overwhelmed by it. Highly theoretical analysis often achieves the opposite: Instead of being convincing, it scares users away from the necessary changes.

A clear vision for a future goal linked up with practical (sometimes seemingly small-scale) changes increases the number of user-friendly use cases. The three examples above have shown both the company-internal improvements and the benefits to the users, especially with long lifecycles in mind. High-tech only survives in the market if it is acceptable to users. Ease of use and an integrated view towards a lifecycle with “barrier-free ISS and ILS” are an integral part thyssenkrupp Marine Systems' digitization strategy.



About the Author
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