

Illustration: Havnevik / Rolls-Royce Marine

Breaking Waves

OPERATIONS REPORT 2016

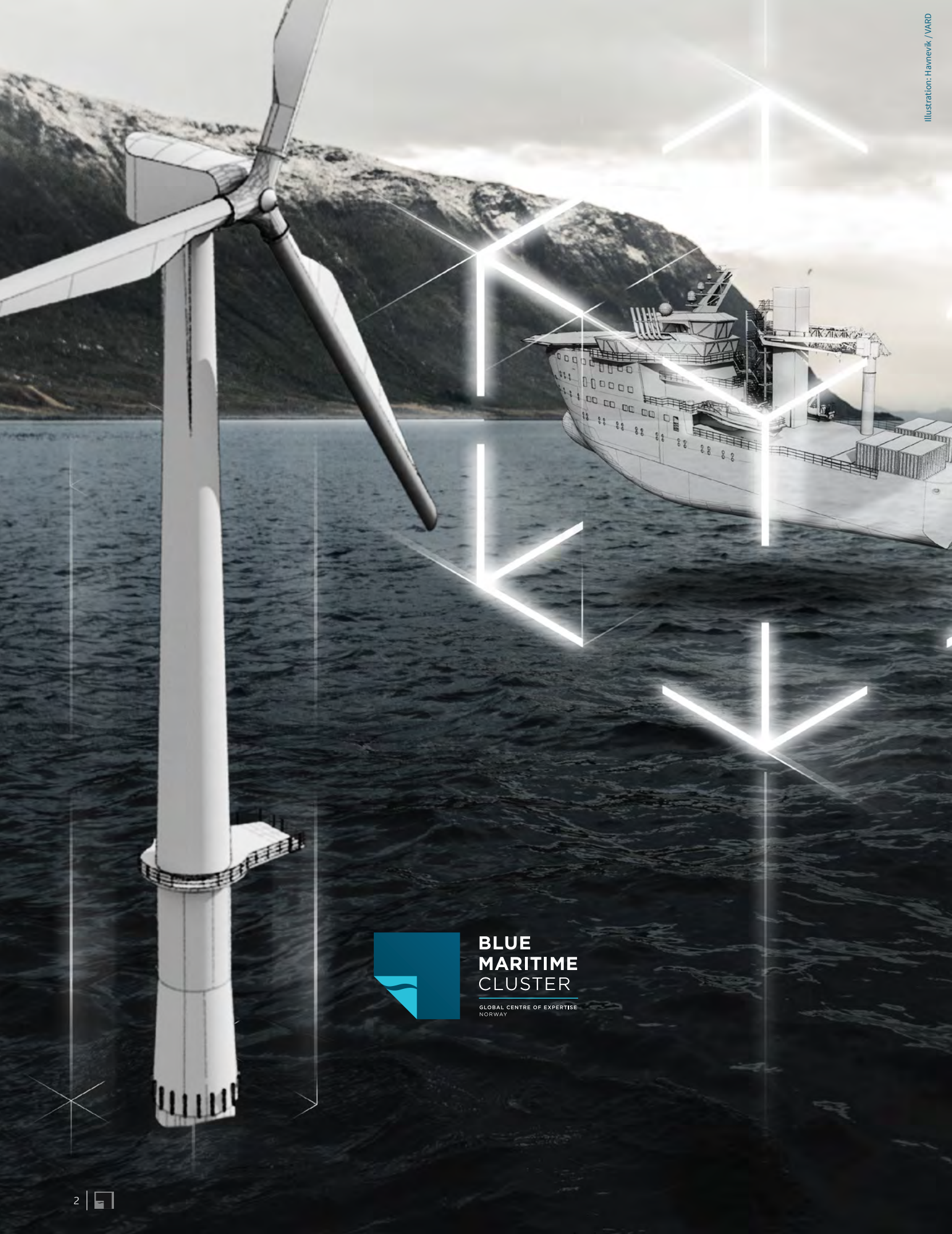


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**BLUE
MARITIME
CLUSTER**
GLOBAL CENTRE OF EXPERTISE
NORWAY



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GLOBAL CENTRE OF EXPERTISE
NORWAY



GREEN COMPETITIVENESS, DIGITALISATION AND NEW BUSINESS MODELS

BY PER ERIK DALEN, GCE BLUE MARITIME CLUSTER

Change, digitalisation and the ‘green shift’ are concepts currently circulating in the political arena and the media. On 28 October, the government’s expert committee on green competitiveness delivered its recommendations to the Prime Minister, Erna Solberg. The report’s starting point is that the oil nation Norway should cut its greenhouse gas emissions by up to 40 per cent by 2030, without compromising value creation, employment or the welfare system.

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PER ERIK DALEN

CEO,
GCE Blue Maritime Cluster

LEADING ARTICLE BY PER ERIK DALEN

There is no doubt that the commitments under the Paris Agreement will have an impact on our industry. There is major potential here. Our businesses and engineers are at the forefront of environmental technology developments, and perhaps ahead of what the market has been willing to pay for. Perhaps part of the solution for commercialising the green shift will be to become as skilled at business model innovation as we are at product innovation. We are already seeing how major companies are increasingly beginning to deliver both products and services and thereby gaining control of a larger part of the value chain. This servitization represents a challenge for our Norwegian business structure where 99 per cent of companies are SMEs. Increasing knowledge of new business models will therefore be one of our three main focus areas for 2017.

A GREAT DIGITAL POWER AT SEA

Norway is one of the world's biggest producers of maritime technology and equipment today. We are also at the forefront of research into autonomous and semi-autonomous solutions at sea. The technology makes it possible to automate and control off-shore operations remotely, i.e. on-shore, and thus reduce costs and help create safer and more environmentally friendly maritime operations. If the authorities and the industry manage to collaborate, Norway has the opportunity to take a leading role in this field. The industry itself is calling for an R&D boost in this area. But it needs to happen fast. The development of digital solutions for use at sea, and in the sea, is progressing more rapidly than we are used to in traditional maritime industry production and more in line with the pace of ICT developments in the last decade. Our input into the government's new ocean space strategy, which will be launched in 2017, centres on an increased focus on maritime digitalisation as one of the most important ways of boosting Norway's competitiveness in the international market.

THE VALUE-CREATING REGION

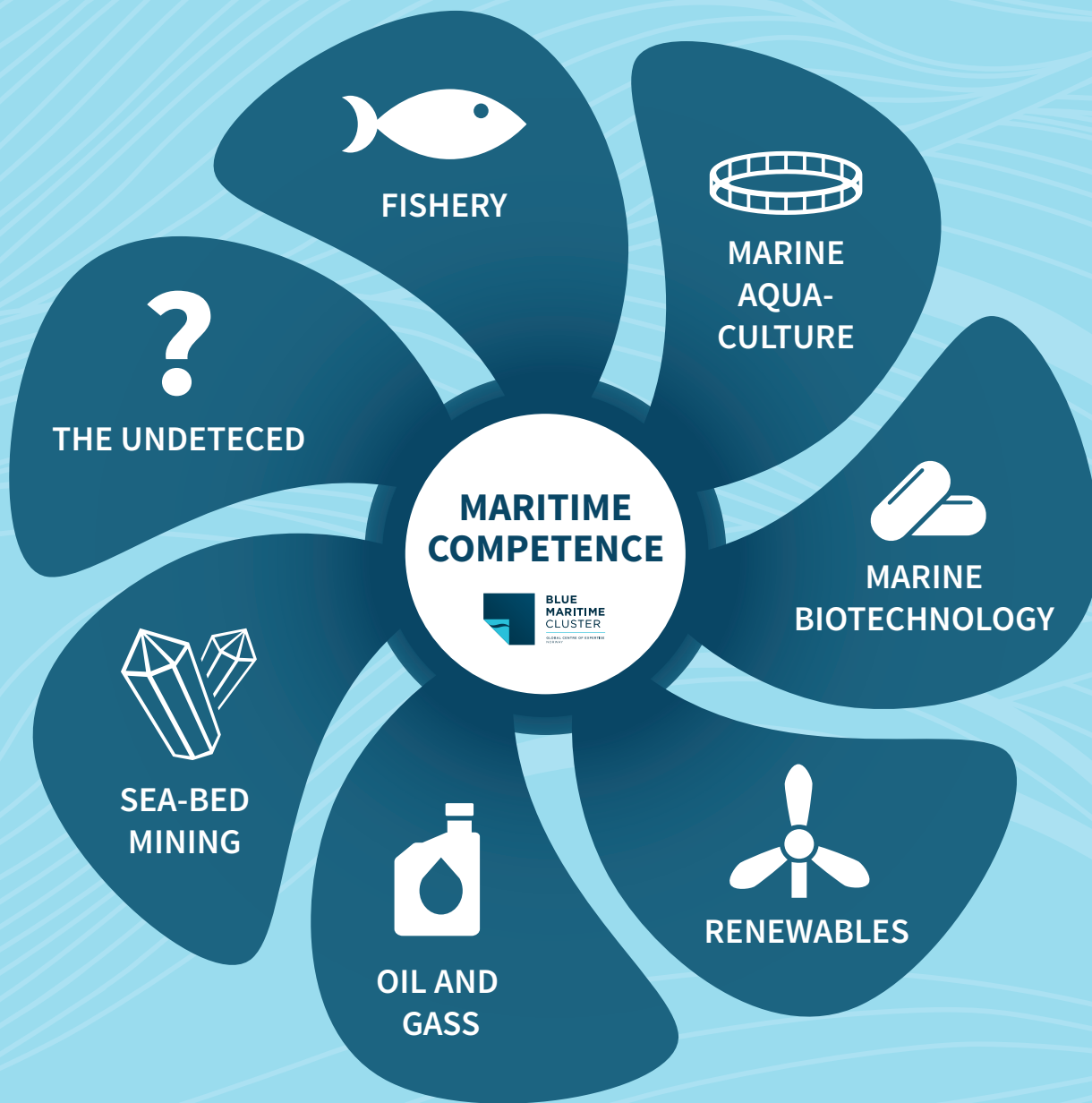
In the shadow of the new municipal reform, the regional division has been given little attention. In Møre and Romsdal, the County Council has decided that it wishes to continue being a separate region. This means that we will be one of Norway's smallest regions in terms of inhabitants, yet also a region that contributes huge value-creation to

the country as a whole. The reason for this is that the region is home to strong, leading business clusters within the maritime, marine, furniture and tourism industries. Promoting and communicating these advantages to young people, investors and decision-makers will be an important task. At the same time, Norway must, as a small country, be able to collaborate across regions for the benefit of the nation as a whole.

BLUE OCEAN INNOVATION ARENA

Two years ago, ÅKP began working to develop an innovation arena for the future. SIVA joined us, and together we established the company Blue Ocean Innovation Arena which will be ready to move into the new building on Campus Aalesund in autumn 2017. The company will serve as an arena for ideas, innovation and entrepreneurship for students, researchers, entrepreneurs and businesses. We also decided to establish the next generation's virtual ocean space incubator in the arena. This incubator is based on enabling technologies within 3D visualisation and Virtual Reality (VR) for virtual prototyping and will be connected to the more than 40 simulators that already exist in the world-leading simulator environment on campus in order to be able to test and verify prototypes. Virtual Reality (VR) computer technology is increasingly enabling the system to respond to participant reactions in real-time. This means that we can develop and test complex products on customers far more quickly and cost effectively than is possible in traditional product development. In this way, we can help accelerate the pace of innovation and cut the time-to-market. Together with the large ocean space research laboratories that NTNU is establishing in the same building, this will create a powerful environment capable of strengthening the entire region. We will also create links with physical automated production environments connected to businesses, testing environments and research institutions.

We believe that ÅKP, as a regional innovation company, helps develop our already strong position as a value-creating region through this large-scale initiative. There is major potential here. We are an integral part of a strong university and we have leading companies with global business activities. At Campus Aalesund we will be doing our bit to ensure that we succeed.



THE FUTURE LIES IN THE BLUE OCEAN

For many generations, the Maritime Cluster in Møre has been a pioneer in technology development and operations at sea. It began with fishing and the development of a modern fishing fleet. Then came the activities connected to offshore oil and gas. As the cluster now ventures into the blue ocean arena, a new chapter is added to our story.

According to the OECD's forecasts, the world's population will increase from the current 7 billion to 9,5 billion by 2050. Meanwhile more and more people are being released from poverty. Consequently, the need for food, energy and minerals is growing rapidly. How the world will ensure sufficient access to these scarce resources in a sustainable way is the biggest challenge of our time. This challenge is not helped by climate changes making food production on land more demanding, and that the climatic challenges require purer forms of energy.

The ocean cluster in Møre is certain that many of the answers to these challenges lie out 'in the deep blue ocean'. Seventy per cent of the earth's surface is covered by sea, eighty percent of which is deeper than 3,000 metres and 90 per cent of the ocean remains unexplored. There is no doubt that 'the deep blue' is the future's most important resource reservoir. We must therefore use all our maritime and marine skills built up over generations to uncover the secrets of the ocean.

GREENER, SAFER AND HEALTHIER

The Blue Maritime Cluster's history of success has been based on rapidly responding to new market opportunities. Innovations have been developed in close dialogue between customers and suppliers. The willingness to take risks and to innovate using prototypes has been central to our success. Increasing globalisation and changing market conditions mean that our recipe for success must be developed further. The blue maritime cluster shall in future focus on developing knowledge bridges to national and international environments which, along with us, can be pioneers in transnational ocean operations. We shall create the best environments in the world and create new, smart and green solutions. Simulations and virtual prototyping

will be central platforms for increasing innovation speed. We shall digitalise the maritime industry and use the opportunities provided by big data and new technology. We shall collaborate with the largest companies within the health and nutrition sectors so that we can develop new, high-value products from fish and fish raw materials. We shall create new technology and new business models that use the resources in a sustainable and gentle manner. Our aims are to make the world greener, safer and healthier through developing the ocean-based industries. Our global attractiveness as a host will attract businesses, talent, expertise and capital that will help us achieve these aims.

MARITIME COMPETENCE IS THE FOCAL POINT

Norway has, for a long time, played a leading role in the fields of offshore energy, shipping and seafood. Maritime competence is the key to success in all these segments, and will be even more important when they merge in the future to become advanced offshore operations within new sectors. Knowledge of the sea, weather and wind, resource bases and sustainability will continue to play a key role and be crucial supporting elements when we develop new technology and new markets.

In this way, we will contribute knowledge and help commercially exploit the ocean in a safe and sustainable way, for the future growth business in Norway! This will create value and employment and will lay the foundations for future prosperity and welfare.

We are certain that our pioneering spirit, our unique experience-based skills and our culture for entrepreneurship make us well placed to create pure food, energy and minerals from 'the deep blue ocean'.

BLUE MARITIME CLUSTER

Global Centre of Expertise

«A cluster is a geographical proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and externalities».

(Porter 1998)

This maritime cluster at Møre is a world leader in design, construction, equipment and operation of specialized service vessels for the global ocean industry. Due to its unique global market position and its important contribution to Norwegian value creation, the cluster is granted the status of a Global Centre of Expertise.

Global Centres of Expertise are a new top level in the Norwegian cluster program and it has been referred to by Norway's Minister for Trade and Industry, Monica Mæland, as the industry's Champions League. Three business clusters in Norway currently carry this status: the Møre maritime cluster and the oil equipment/drilling cluster in Sørlandet and the oil and gas subsea cluster in Bergen. It is a national status awarded by the government to the most global business clusters in the country. It will assist in increased value creation and strengthened attractiveness and position within global value chains, through strategic collaborative projects between the cluster's partners and with external partners.

The status involves the financing of a cluster project. BLUE Maritime Clusters objective is to incite and strengthen team-based development activities in the maritime cluster at Møre with the aim of increasing the clusters' dynamism and attractiveness and individual companies' innovativeness and competitiveness. ÅKP is a facilitator for the cluster project

BLUE MARITIME STEERING COMMITTEE



- 01 **GUNNAR HAREIDE** Chairman of the Board, ÅKP AS
- 02 **KARL JOHAN BAKKEN** CEO, Farstad Shipping
- 03 **HELGE GJERDE** President, Rolls Royce Commercial Marine
- 04 **GUNVOR ULSTEIN** CEO, Ulstein Group
- 05 **ROY REITE** CEO, VARD
- 06 **STÅLE RASMUSSEN** CEO, Kleven
- 07 **KARL INGE REKDAL** CEO, Sykkylven Stål
- 08 **MARIANNE SYNNES** Rector, Høgskolen i Ålesund
- 09 **NJÅL SÆVIK** CEO, Havila
- 10 **ODD TORE FINNØY** CEO, Brunvoll
- 11 **STEIN BERG OSHAUG** CEO, Oshaug Metall

8 SMART GOALS

The cluster project Blue Maritime has 8 smart goals that we work by.

1 INCREASE THE SPEED IN PRODUCT INNOVATION

Further develop the cluster's innovation platform, and the culture for innovation in global value chains. Increase the rate of innovation through specific projects that lead to new ideas and knowledge.

2 INCREASE THE SPEED OF PROCESS AND ORGANIZATIONAL INNOVATIONS

Further develop the cluster's skills in effective production. Implement specific projects that introduce new production technology, knowledge and logistical solutions and LEAN.

3 STRENGTHEN GLOBAL KNOWLEDGE CONNECTIONS FOR WORLD-LEADING TECHNOLOGY AND KNOWLEDGE ENVIRONMENTS

Chart and connect with the right research environments, networks and clusters. Enter partnerships with relevant environments.

4 STRENGTHEN NATIONAL KNOWLEDGE CONNECTIONS WITH RESEARCH ENVIRONMENTS, CLUSTERS AND MARITIME COMPANIES

Further develop and strengthen existing cooperation agreements. Develop new, complementary networks and specific cooperation projects with other relevant Norwegian clusters and knowledge environments.

5 CREATE GLOBAL SMB WINNERS

Increase the knowledge level and create new business models for SMB companies.

6 CREATE NEW ENTREPRENEURS AND GROWTH COMPANIES

Further develop fully integrated innovation systems. Develop a global start-up programme.

7 INCREASE HOST ATTRACTIVENESS

Increase visibility and reputation building. Focus on regional development and recruitment. Increase dialogue with companies, knowledge institutions and authorities.

8 CROSSOVER-INNOVATIONS FROM THE MARITIME INDUSTRY TO NEW MARINE BUSINESSES

Increase knowledge and interaction between different marine businesses. Set up specific projects that lead to new knowledge.

GOLD LABEL APPROVAL FOR GCE BLUE MARITIME



Gold Label approval for GCE Blue Maritime
The European Cluster Excellence Initiative has awarded the cluster organisation GCE Blue Maritime Cluster with the quality label "Cluster Organisation Management Excellence Label GOLD".

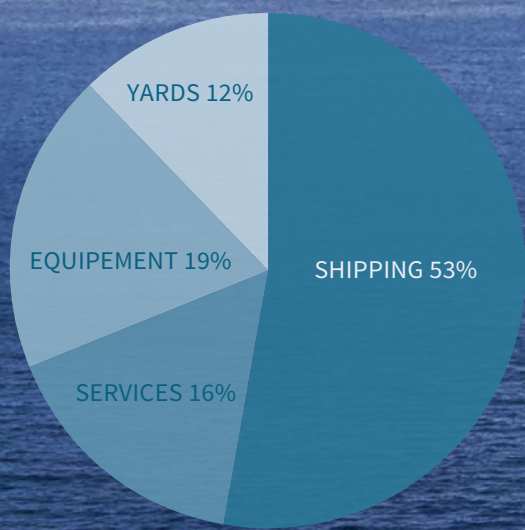
The "Cluster Management Excellence Label GOLD" acknowledges cluster organisations that demonstrate highly sophisticated cluster management and that are committed to further improve their organisational structures

and routines for the benefit of an even higher performance.

This is an important recognition and a seal of quality for the work we do. This certification will make it easier to partner up with the major industrial clusters in the EU, says Per Erik Dalen in GCE Blue Maritime Cluster.

The GCE Blue Maritime Cluster is one of only 80 clusters from 16 countries who have the status of "Gold Label".

CLUSTER VALUE ADDED 2015



TURNOVER
-12 %
Development
(2014/2015)

VALUE ADDED
-15 %
Development
(2014/2015)

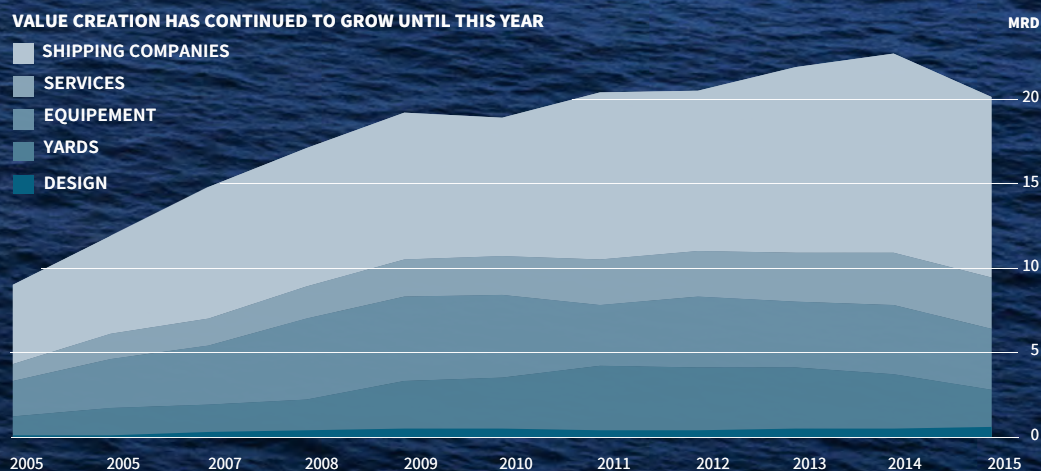
OPERATING MARGIN
-8 %
Development
(2014/2015)

EMPLOYMENT
-8 %
Development
(2014/2015)

BLUE MARITIME CLUSTER

GLOBAL PERFORMANCE BENCHMARK ANALYSIS

The last two years have been difficult for the Blue Maritime cluster in Møre. After 12 years of continuous growth, both value added, revenues and employment fell by respectively 15, 12 and 8 percent. For the companies that constitute the cluster, profitability from the business was wiped out. The cluster is now in a restructuring phase and the industry is looking for new sufficiently large and attractive markets opportunities to capitalize on the unique innovation capabilities.



Menon Business Economics 2016

HIGHLIGHTS

MENON BUSINESS ECONOMICS - SEPTEMBER 2016

Companies in the Blue Maritime Cluster demonstrated spectacular growth from 2004 to 2014 with the total value added increasing at, on average, 13 percent annually, reaching 23 billion NOK in 2014. Thus, more than 8000 new jobs were created in the cluster. That said, the growth, by all measures, already started to slow in the period from 2009-2014. This reduction in growth of revenue and value added coincided with stagnating productivity. Hence, it seems that the dramatic drop in revenues and profits cannot be entirely explained by market conditions.

Benchmarked against companies offering similar products and services in Norway, we see that the members of Blue Maritime have performed well, but there are signs that they have been falling behind their Norwegian counterparts recently. In the last four years, the national benchmark has seen significantly higher growth and better productivity development than the Møre cluster. While the national industry has increased its productivity since 2011, productivity growth in Møre has stagnated.

THE FALLING OIL PRICE IS A CATALYST FOR RESTRUCTURING THE CLUSTER

The falling oil price was the catalyst that uncovered the large oversupply that the market is currently facing. From levels of above USD 100 per barrel in 2010-2014, the oil price appears to have stabilized around USD 45-50 per barrel by the fall of 2016. As a result, 2016 may be the first year in a decade when no new offshore vessels will be ordered at Norwegian yards.

The whole cluster is struggling, but the focus in 2016 has been on the shipping companies. They are struggling with high debt and a critical need for financial restructuring. Rem Offshore was earlier this year acquired by Solstad and the Aker-group, while the situ-

ation for many other companies currently is uncertain. It will be a huge blow to the cluster if large parts of the shipping companies' activities are moved away from Møre.

Last year report highlighted that the market circumstances called for substantial revisions of the companies' strategies directed towards international expansion and, for some segments, diversification out of the offshore oil & gas industry, improved operational efficiency, flexible management of capacity, and increased focus on financial risk management. During 2015 and 2016 we have seen yards and ship designers targeting other vessel types with surprising success. The shipping companies' ability to adapt to new market conditions is of course more limited, since they are stuck with irreversible investments in offshore service vessels.

WILL THE CLUSTER RETAIN COMPETITIVENESS?

The cluster has historically demonstrated a remarkable capability for strategic transformation through both company and cluster-based innovation. The collective knowledge that innovation relies on – carried by firms and research institutions and spread among them through buyer-seller relations, cooperation, informal communication and mobility of people – is strong in the Møre region. In addition, the critical mass that the cluster has gained in the last decade has made it much more robust to adverse shocks than it was ever before.

Although the Møre cluster has achieved an impressive performance over the last ten years, three fundamental questions about future competitiveness can be raised:

1) PRODUCTIVITY

Since 2009, productivity in the cluster has stagnated, while the rest of the offshore oriented part of the maritime



ERIK W. JAKOBSEN
Menon Business Economics


industry in Norway has improved productivity. *Why has productivity stagnated, and how will it impact competitiveness in offshore markets when global demand starts to increase?*

2) THE VALUE CHAIN

The most distinguishing feature of the Møre cluster has been the tight value chain structure, with internationally competitive companies within the local cluster in all steps in the value chain. This vertical structure is under pressure for two reasons: a) The offshore shipping companies will probably consolidate, and ownership and headquarters may be centralized outside Møre. b) The ship designers and yards in Møre show an impressive ability to adapt to market changes by switching to other types of vessels, for example ferries, cruise ships and well boats. *How will cooperation, knowledge flows and cluster-based innovation be affected when the buyer-seller linkages in the local value chain are broken?*

3) STANDARDIZATION AND COST-EFFICIENT MASS PRODUCTION

The Norwegian maritime industry, and the Møre cluster in particular, has been in the forefront of the technological breakthroughs and innovations of new ship types and equipment for many decades. However, yesterday's innovations are today's standards, because customers will require standardized solutions to reduce their own costs. This implies that the competitive conditions probably will be different when the offshore oil & gas market returns. Hence, there is need for innovative solutions within the offshore market, and for continuous search for new growth opportunities. *Can the Møre cluster find sufficiently large and attractive market opportunities to capitalize on innovation capabilities?*



A TOUGH, BUT NECESSARY, RESTRUCTURING

– Rolls-Royce achieved a large part of its maritime turnover in the profitable oil and gas segments... until oil prices plummeted. The situation is definitely challenging, but in a few years we'll be able to say that the changes that followed were appropriate and important for the maritime industry.

"Norway is a leader in many areas of the maritime industry, and we need to maintain that position. Development is accelerating."



«The years between the millennium shift and 2014 was one big up-turn», says Helge Gjerde, President Offshore & Merchant Solutions at Rolls-Royce Marine AS. «When the financial crisis was at its worst, our industry's order books were full and we hardly noticed it. But we do now. Several of the traditional segments are now more or less in the dumps, and everyone's fighting it out in the segments where something is happening.» The competition is tough.

«When the oil companies downsized their exploration and cut investments, this left equipment suppliers, shipyards and shipowners with a significant overcapacity. For Rolls-Royce, it was particularly the demise of deliveries to major anchor handlers, drillships and floating rigs that hit us hard. We also noticed a downturn in the aftermarket. Laid-up vessels require little service and few spare parts», says Gjerde.

When the market changed, Rolls-Royce had already begun to look at its costs and organisational structure. The work continues, and Gjerde believes that the operators who succeed in their restructuring and with their investment in new technology will now survive. He is confident that oil and gas will pick up again, but also says that the world will not be like it was before.

«I think that we're now in a situation that is forcing the maritime industry to do some radical rethinking in many areas.

RESTRUCTURING IN THE SHORT AND MEDIUM TERM

The major megatrends in the industry affect the long-term commitment to Rolls-Royce. These are connected with automation and electrification, more intelligent technological solutions and systems in ships, increased automation in industrial production, increased standardisation and especially a focus on safety and the environment.

«But from a short and medium term perspective, it's as much about adapting to the opportunities we see now in neighbouring markets», says Gjerde.

He mentions the current opportunities in the marine environment related to energy and food production, wind power, fishing and breeding. In addition, there is plenty of building activity going on in terms of cruise and passenger ferries, advanced research vessels and coastguard vessels. «Decommissioning» is also a potential offshore application area, in other words, activities associated with the closure of fields and dismantling of installations.

«In the short term, it's about adapting and further developing what we have so as to be able to access new segments. In the medium term, there are also untapped opportunities in the marine environment, including new and more sustainable methods of harvesting.

Gjerde points out that the shipyards in North-western Norway have been good and visible examples of the positive things that are taking place in the maritime industry.

«They have seized on new opportunities and are making use of the expertise gained from the construction of advanced offshore vessels to build new types of vessels. It's demanding, but they're increasing their competitiveness and winning contracts in new segments. Of course, the currency situation has helped a lot, but much is also being done by the companies themselves by adapting their cost structures.»

WHAT'S TAKING PLACE WITHIN ROLLS-ROYCE?

«Pretty much the same thing. As you know, we're developing new cruise ships for the expedition market, such as the two new vessels for Hurtigruten. In this segment, we're making use of a lot of expertise gained from the design of offshore vessels for the polar regions. This includes two highly advanced research vessels currently under construction, the Kronprins Haakon and the Sir David Attenborough. Both of these research ships have been designed by Rolls-Royce here in Norway. Equally important are the equipment packages, which include energy-efficient propulsion systems.» Meanwhile, Gjerde is pleased about the repeat orders for advanced fishing boats.



«Norwegian and foreign fishing fleets are earning money and gladly investing in increased efficiency and more profitable operations. These are vessels we're good at, both in terms of design and equipment.

Now we're hoping to be able to compete for the supply of several new ferries for the Norwegian national road network. Orders for some of these have already placed by Norwegian yards. There are strict emission requirements for these. Here we have several well-proven, reliable solutions such as gas and hybrid operation.

It's an area that gets the entire cluster involved», says Gjerde.

WE CAN BECOME A DIGITAL POWER OFFSHORE

In the long term, much therefore depends on automation and more intelligent vessels. Rolls-Royce has been working on this for a long time, and has been working with the technology community in various places around the world, including Norway. Much of the technology is available today. With new solutions, this can also generate completely new needs.

HOW FAR INTO THE FUTURE IS THE REMOTE CONTROLLED SHIP?

«The speed with which this is happening is much faster than we thought just a few years ago. And so are the levels of autonomy and automation. Some ships would stand out as more suitable than others. When it comes to ocean crossings, that's a bit further off. One reason is that it requires extensive changes to regulations that many countries need to agree on. But ferries crossing Norwegian fjords might not be so far away. We're already developing systems for automation of fjord crossing and docking. Short distances and frequent departures in protected waters place Norway in a somewhat unique position when it comes to development and accumulation of experience. If the authorities, research institutes, clusters and individual companies are all playing in the same team, Norway could become a digital power offshore.

THIS HAS GREAT IMPORTANCE FOR THE LONG TERM

Norway is a leader in many areas of the maritime industry, and we need to maintain that position. Development is accelerating. Here are some of the issues, which in Helge Gjerde's opinion are of crucial importance.

- **WE MUST MAINTAIN AND STRENGTHEN THE NORWEGIAN MARITIME CLUSTER**

Many countries have maritime clusters, but none are as complete as the Norwegian one is. We need to look after it so that it remains a significant benefit.

- **CONTACT WITH OTHER INDUSTRIES**

The Norwegian maritime industry needs to be inspired by other types of industry. Many of the solutions we will be using in the future are under development in other industries.

- **WATCH OUT FOR GAME CHANGERS**

Great changes and ideas may arrive that do not originate in any of the environments we are familiar with today.

- **GOVERNMENT SUPPORT FOR RESEARCH AND DEVELOPMENT**

Support for the maritime industry in Norway is currently fragmented. We have now taken the initiative to change this. Digitisation of the shipping industry is a key area, and we believe it is important that the Norwegian authorities consider and adapt their contributions to the industry accordingly. We are global, but at the same time we want to further develop the solid expertise we have in this country.



INVESTING HEAVILY IN R&D

The Maritime Cluster in Møre has, for a long time, strongly focused on the interaction between research, training and industry. NTNU in Ålesund collaborates closely with GCE Blue Maritime Cluster and the businesses in the maritime cluster on the development of new and useful market-related concepts. This research is both necessary with respect to developing better training and as an engine for new innovations.

THE BUSINESSES RELY HEAVILY ON R&D

The cluster is characterised by its high innovation speed and entrepreneurship. Large parts of the R&D costs in new ship projects are not covered by public subsidies, and are therefore not recorded in official R&D statistics. For example, the Ulstein Group spent NOK 174 million on R&D in 2015. Of this amount, only NOK 4.3 million was received as a public subsidy (2.5%). Every year, Rolls-Royce Marine spends somewhere between NOK 200 and NOK 300 million in the cluster. If we look at the situation overall, it

is likely that the 220 businesses in the cluster spend well over NOK one billion on R&D each year.

TEAMING UP WITH THE PUBLIC

All the same, considerable resources are used up in publicly financed R&D. Figures from the SkatteFUNN scheme, which provides businesses with tax deductions for R&D expenses, show that the maritime cluster in Møre accepts around 25% of all applications on a national basis and this clearly places the region in the number one spot. The

Research Council of Norway, Midtnorsk forskingsfond and VRI have, over recent years, distributed several NOK hundred million in research funds to the maritime industry. Innovation Norway in Møre and Romsdal is clearly Norway's largest grant-providing body and is almost three times as large as the number two county (Nordland) and number three (Hordaland) on the list. In 2015, the total amount committed (in loans and grants) by the organisation was almost NOK 1 billion.

NTNU'S RESEARCH ARENA FOR OCEAN SPACE OPERATIONS (ROSO)

NTNU in Ålesund is planning to build a unique research lab for future ocean space operations. Simulation has been used for decades to test the physical aspects of maritime systems and operations. Simulators are used to train crew to perform

demanding maritime operations. Next generation technology has the potential to provide Virtual Prototyping to pre-test marine operations, including the human component.

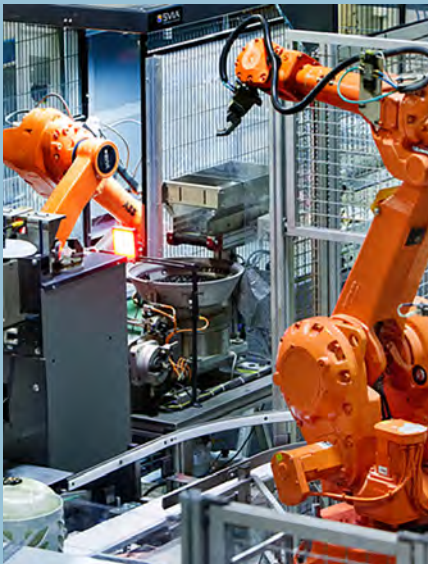
This project proposes to move simulation technology from the surface to the ocean environment. By virtually merging offshore industry, fisheries and aquaculture, the largest Norwegian industries, we will be able to create ocean space simulator for future operations.

Innovation is the key to our research. In the future, we will be able to test new ship concepts, experiment with combinations of equipment and train crews in virtual

operations before they are carried out in real operations. Such a development will boost innovation and is at the core of our research. It is also an urgent need to do research of how to manage and perform operation remotely.

The centre will include a flexible set-up for a variety of workplaces on-board as well as remote-operations control centres.

The main display screen is a 10-13 m outdoor spherical dome, using a 360-720 degree projection display solution. Lab facilities such as we propose do not exist in Norway or anywhere else in the world.



AIMING TO INCREASE EXPERTISE IN SUSTAINABLE INNOVATION

SISVI (Sustainable Innovation and Shared Value Creation in Norwegian Industry) is a four-year long expertise project at the interface between industry and research. The overarching objective of the project is increased Norwegian industry competitiveness founded on shared value creation and sustainability where strategic, economic and societal needs are in confluence.

Specific company goals:

The integration of knowledge spanning traditional perceptions of internationalisation, innovation and value chain management and making this available through

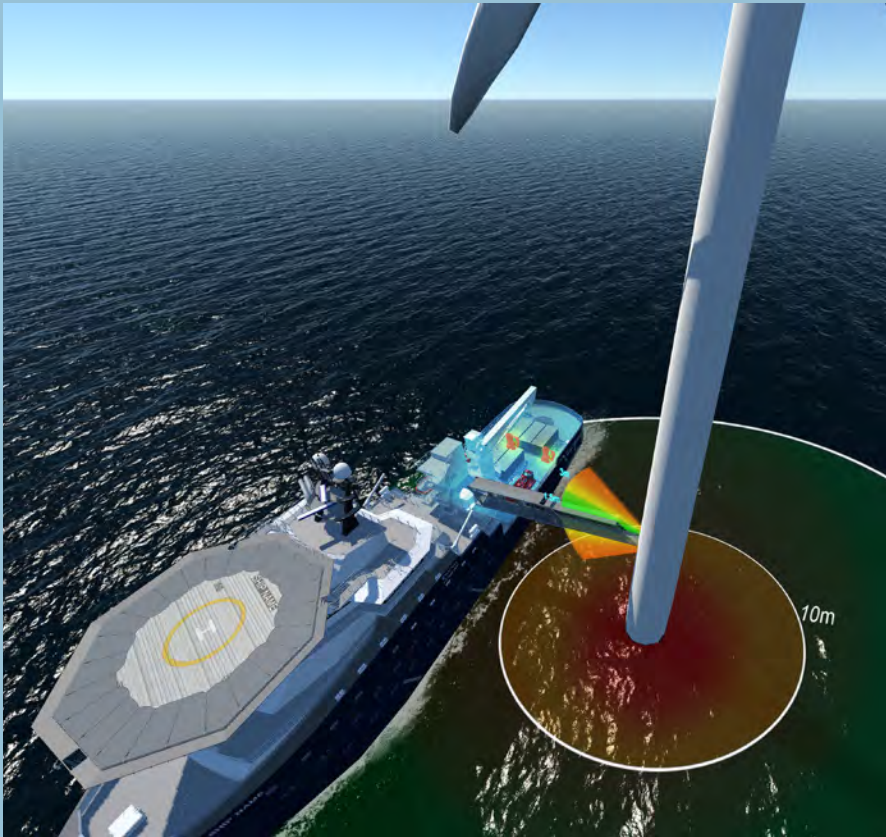
- Guidelines and decision support tools to help implement sustainability strategies in the companies
- Business models (Corporate governance models) focussing on sustainability, accountability and shared value / sustainability, accountability and shared value creation

GCE Blue Maritime is partner in the project

FROM OFFSHORE TO ONSHORE

The BIA X advanced building project aims to develop and implement a simulator platform that will serve as a process and planning tool during construction of complex buildings. The simulator will utilise LEAN construction methodologies and be developed in cooperation with NTNU. It

will be used for basic training and common understanding during building and construction operations, as well as LEAN constructions. GCE Blue Maritime is partner in the project.



INNOVATIVE INSTALLATION OF OFFSHORE WIND POWER SYSTEMS

Wind energy is now a 72 billion Euro and 300.000 jobs industry in Europe and it is expected to serve 25 % of the EU's electricity needs in 2030. Offshore wind is expected to grow by 28 % yearly (WindEurope).

A year ago it was announced that Statoil is building the world's first floating wind farm off Scotland, at a total cost of around NOK two billion.

Today, wind turbines installed in shallow waters with jack-up ships and performed in 5 lifting operations after the foundation is set out. The maritime operations represent 30-45% of the cost of building out offshore wind. There is therefore a need for new technology to reduce costs.

In the long term, we believe that new wind farms will be located in areas with deeper water. SFI MOVE works with innovative solutions that allow to mount offshore wind turbines in one lift from floating vessels. This requires advanced robotic technology which compensates for heave and roll of the ship.

VIRTUAL PROTOTYPING OF MARINE OPERATIONS

The idea is to implement a simulation oriented design approach in the maritime industry, from design to execution of the operation to increase innovation speed and cut time to market.

The motivation for this framework is:

- Transform the industry to a performance oriented operation approach.
- Increase innovation by fast prototyping
- Reduce cost by reuse for models during the process from preliminary investigations to execution of operations

The project wants to develop:

- Common standards and format for the maritime industry
- Generic models allowing suppliers in the maritime industry to customize behaviour and deliver models as a part of their delivery.
- Scalable systems, from integrated system to on-board systems
- Smooth transitions from heavy simulations to real-time systems

SFI MOVE

NTNU in Ålesund is home to SFI Move (Centre for Research-based Innovation in Marine Operations). This is an eight-year research programme with a budget of NOK 200 million. The main objective is to establish a world leading research and innovation centre for demanding marine operations. GCE Blue Maritime is a partner in the project.

EXAMPLES OF ONGOING PROJECTS:

SAFE – ALL YEAR – COST EFFICIENT SUBSEA OPERATIONS

Subsea installation and services have operational limitations due to environmental conditions such as waves, wind, currents and water depth. As subsea field developments are getting more extensive and complex, there is an increasing need for low cost all-year marine operations.

Objectives to improve of the operational limitations are:

- Improve HSE by making the operations more robust vs. available weather window.
- Make operations safer and with required accuracy.
- Reduce total field development costs by more cost-efficient marine operations.
- Increase operational efficiency of subsea fields by all year vessel operation.





WANTS TO CRACK THE DIGITAL MARKETING CODE

A new innovation project intends to highlight recently acquired knowledge about international digital marketing for the maritime cluster. The Ålesund company Racer is managing the project along with the Ulstein Group, Metizoft, Uptime, GCE Blue Maritime and Innovation Norway.

Increasingly tough competition and a need for reorganisation in the maritime industry have led to a greater focus on cost/benefit analysis of the implemented marketing initiatives.

«When using digital platforms such as Google, Baidu and Facebook, we want to find the answers to how the maritime industry can most effectively promote itself on the international scene», says Racer's Olav Sindre Kriken.

«We want to measure the impact and costs of the targeted use of digital channels, both organically and via purchased placement, and this will give us a clear roadmap as to how the maritime cluster can most cost-effectively reach out internationally, and by so doing make optimum use of its investment in marketing. We're doing this by stocking up on Big Data from prospective sales leads from, for example, Asia and Europe, and analysing and visualising them», says Kriken.

Lene Trude Solheim from the Ulstein Group says that they are using a proportion of their

resources in digital marketing via digital channels. Meanwhile, she thinks there is massive potential for finding out more about how it really works.

«Briefly put, we're going to collect as much data as we can, to be able to digitally put out a relevant marketing message directed at a better segmented audience», she concludes.

Frank Støyva Emblem of the GCE Blue Maritime Cluster is in no doubt that this work will prove important for the industry.

«From our perspective, it's of ultimate importance that we acquire new knowledge about this area, because it's been taking quantum leaps in recent years. This is ground-breaking stuff, and it's where we have to be», he says.

FIELD DEVELOPMENT IN REMOTE AND HARSH ENVIRONMENTS



NTNU, the Memorial University of Newfoundland (MUN), Statoil and GCE Blue Maritime are developing leading environments within field development and operations in challenging and remote areas.

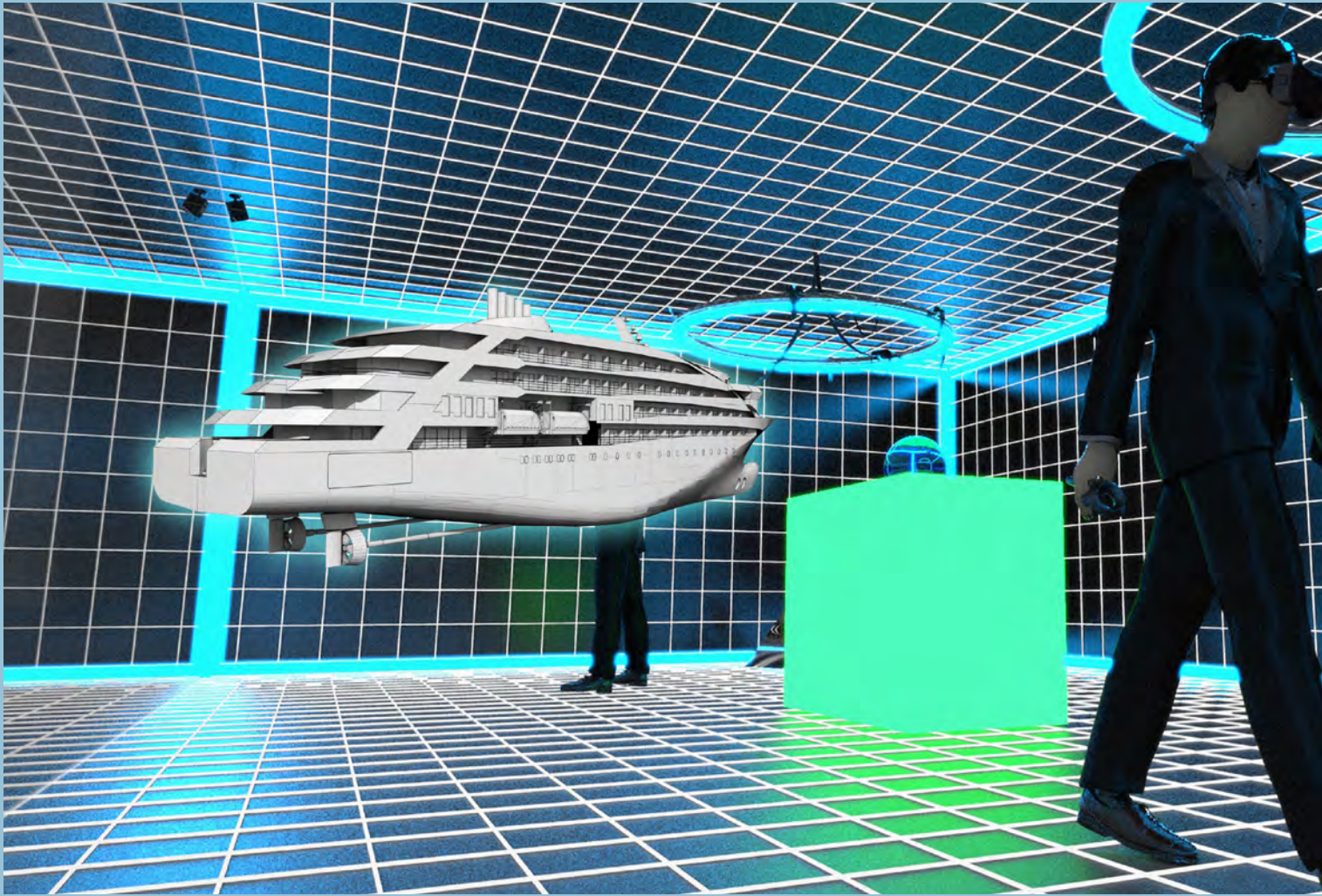
This is a 3-year project aimed at establishing an enhanced level of cooperation between the foregoing institutions. A successful workshop in Trondheim was held on 8/9 February around the topic of «Field development in remote and

harsh environments». 25 delegates took part and the issues discussed were marine operations, autonomous operations, integrated operations, logistics and contingency, drilling and improved recovery.

Norwegian and Canadian industry will contribute with relevant issues and challenges that a number of master's and doctoral students will be working with in the years ahead. The objective is to establish a world-leading academic and industrial environment within

field development and operations in challenging areas, and this should contribute to an increase in Norwegian and Canadian value creation.

One element of the project was the participation by students from NTNU and MUN in a six week summer school in St. John's in Newfoundland, Canada during 2016.



BLUE OCEAN INNOVATION ARENA

Accelerating innovation

The Blue Ocean Innovation Arena is on track. In October 2017, the plan is to open the doors to unveil the innovation platform of the future; a joint innovation infrastructure for companies and start-ups that want to speed up innovation in their effort in commercialising the oceans. Here, business and

research will work together to develop tomorrow's technical solutions and business models. The aim is to reinforce cross-over collaboration between the clusters in different sectors and technology areas to accelerate innovation, entrepreneurship, and scaling of companies.

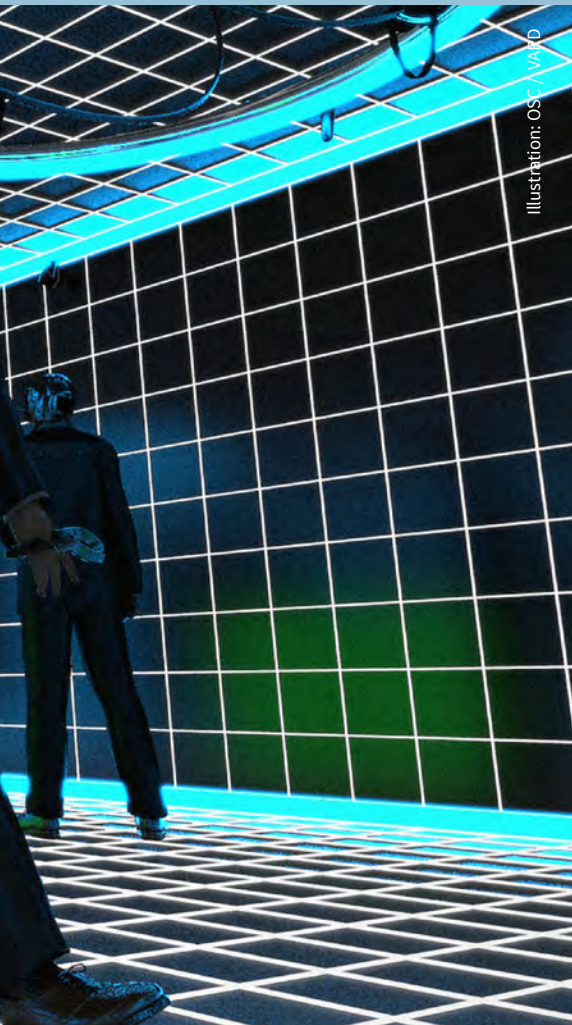


Illustration: OSC / VAI/O



NEED FOR CHANGE

The maritime cluster in Møre is known for its global importance within the fields of design, production and operation of advanced offshore vessels. Since the 1970's, the technology has been developed in close collaboration with customers, becoming ever more advanced and complex. One of the enablers for this journey has been the ability to innovate fast, built on high level of experience-based skills and farsighted ship owners.

The slowdown in the oil and gas business is hitting the cluster hard. There is a need for reorientation into other market segments, including those who formed the hotbed for the industry. Fortunately, these segments have moved on with respect to complexity, e.g. introducing advanced low emission

propulsions system and on board fish treatment facilities, making Norwegian yards and suppliers competitive.

To stay ahead, building a winning strategy on innovation speed and cost reductions will be necessary. As the experienced based innovation platform was challenged by global value chains even before the slowdown, mastering the digital innovation and production platform becomes crucial.

Pioneering this transition and contributing to a revived innovation platform to face the new challenges is an important part of the GCE Blue Maritime task.

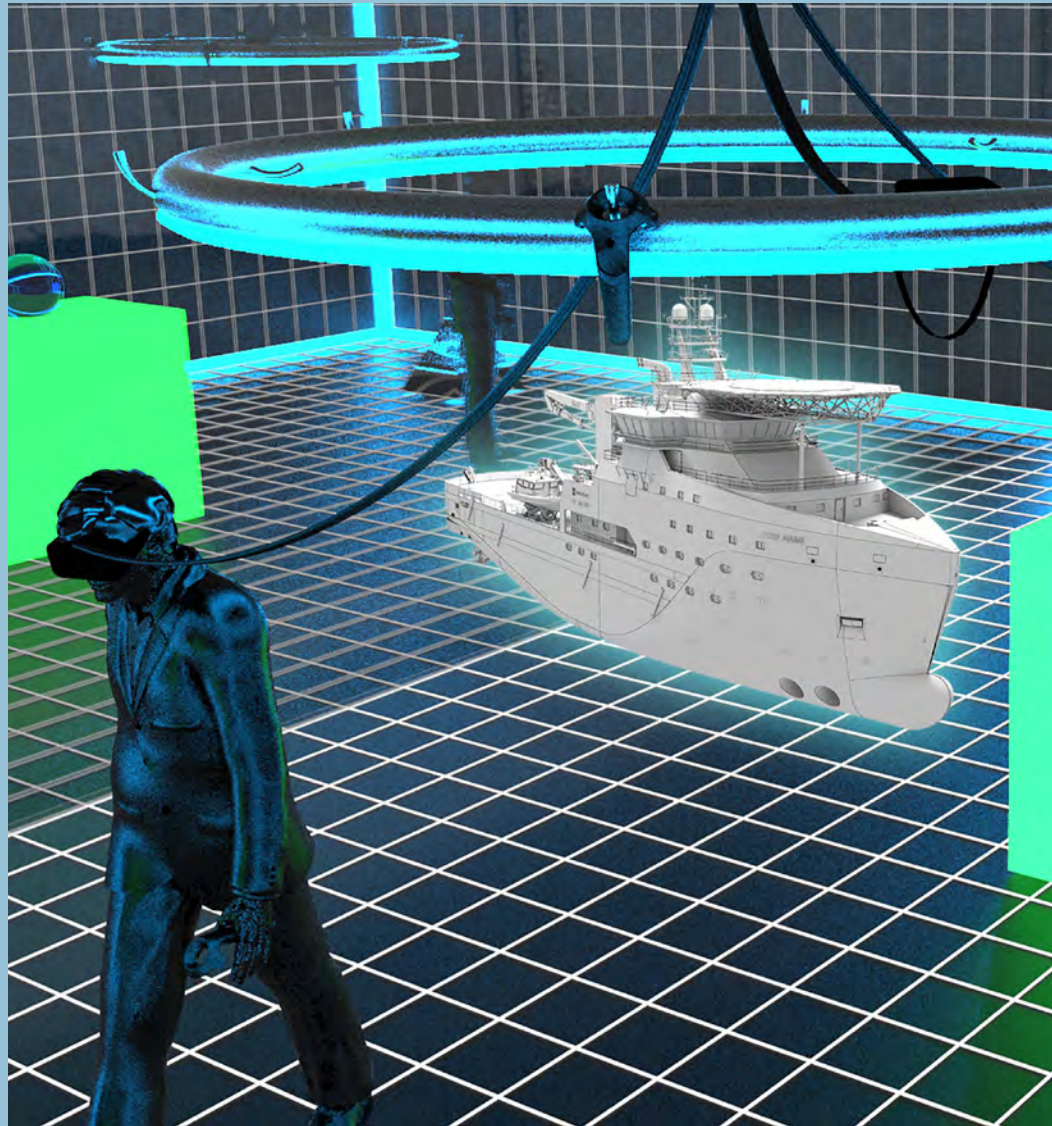
VISUALISATION THEATRES

The most important physical asset of the arena will be the three visualisation theatres:

- XPO, a 25 m2 high resolution display, with double visibility – from the foyer downstairs and inside the facility.
- 360°, a high resolution circular 3m x 28 m display, visible both from inside and outside the circle, surrounding a 60 m2 large meeting room.
- VRLAB, a 50 m2 large lab, providing the latest there is of head-mounted displays (AR and VR glasses) and high precision position systems.

The facility will be staffed by highly skilled people to ensure the expected user experience and result for the different user groups – students, start-ups and companies. The visualisation theatres are generic by nature, and designed for multi-use, including:

- Virtual prototyping, enabling companies



to test new concepts, engineering and production solutions by exploring the solutions virtually before they are built.

- Virtual trialling, making it possible to take a virtual tour of e.g. the vessel before constructed, either to convince the customer, test the performance or acquainting the crew before handing over the vessel.
- Virtual training, providing training of e.g. service personnel in disassembling and assembling equipment before doing this in the field.
- Big Data exploration, visualisation of big data sets to enable humans to extract the inherited, hidden information. From all information on board a vessel to the monitoring of different biological stocks and the environment.

START-UP ACCELERATION

The start-up lab will be an important integrated part of the facility. The lab will build on the principles and tools established and developed in the MIT REAP project - bringing together five major stakeholders; academia, entrepreneurs, risk capital, government and businesses. Early testing of hypothesis, both technical and business wise, is crucial and the arena will be used to visualise ideas and involving these stakeholders. Since speed is crucial for effective incubation, the arena can become a central tool for accelerating the process.

COMPETENCE BUILDING AND SHARING

Building knowledge is essential, both in the industry, amongst the start-ups, the students and the surroundings.

For NTNU and the students, the arena will provide facilities for training in 3D, virtual prototyping, visualisation and associated disciplines, including the facilitation of master students. It's a goal that blending companies, students and entrepreneurs shall trigger new business ideas not born otherwise.

The arena will also be the host for a lot of different kinds of events and seminars, ranging from market and technology development, to business models and trends driving the future. Some very targeting, other more generic or cross sectorial.



Illustration: vobis-visuals.com



PILOT PROJECT IN THE BRAND NORWAY INITIATIVE

Brand Norway is one of Innovation Norway's strategic priorities for the next four years and aims to develop a strong common brand for Norway. GCE Blue Maritime and the other ocean clusters will be a pilot project in this national initiative.

The project will contribute to increased growth and value creation by strengthening Norwegian export and ensure access to capital, knowledge, talent and tourists. One wishes to unite business and government in a common and long-term commitment that will permit increased exports and economic growth across industries.

- This is not about creating a new logo for Norway, but a comprehensive strategy to strengthen our international competitiveness. The ocean industries are Norway's strongest card internationally and we believe it is important to be involved in developing a new national brand, says Per Erik Dalen, GCE Blue Maritime.

The project has defined five key focus areas:

- An aggressive export strategy for Norwegian goods and services
- A strategy to attract foreign investors, talents and tourists
- An adaptation of Innovation Norway tools
- Establish collaboration arenas
- Develop a Norwegian brand and communications platform

The first workshops in the project started up this autumn

GCE COLLABORATION ON INDUSTRIE 4.0 PROJECT

GCE Blue Maritime, GCE Subsea and GCE NODE have been awarded 2 million Norwegian kroner for a joint project.

The Norwegian government announced this year funding of 20 million Norwegian kroner to support restructuring of the supplier industry within the petroleum sector in Southern and Western Norway. The three GCE Clusters in Norway have initiated a collaborative project to take a leading position in the ongoing restructuring.

INCREASED COMPETITIVENESS

The main objective of the project is to contribute to increased competitiveness in the GCE's partner and member companies' main

markets nationally and internationally. This includes new business models and new technologies for lowering opex and capex.

The project will focus on four strategic areas, closely linked to industrie 4.0, all of which have the potential for significant cost reductions; framework conditions, innovations along the supply chain, new production technologies, and new maintenance and operating systems.

INDUSTRY INVOLVEMENT

The project had a kick-off medio November and will involve a series of industry focus group meetings and workshops.



Workshop in Design Thinking held by Ade Mabogunje from Stanford University

INTER CLUSTER COLLABORATION

GCE Blue Maritime Cluster enjoys broad and vigorous collaboration with a number of technology and industry environments, both nationally and internationally. The excellent collaboration with technology clusters in Norway continues. This is especially true when it comes to the oil technology environments of GCE Node and GCE Subsea. The excellent collaboration with NCE

System Engineering Kongsberg and the manufacturing environment surrounding NCE Raufoss is also on-going. The clusters have complementary technology skills and a range of common challenges.

INTERNATIONAL NETWORKS

During last year, GCE Blue Maritime has been working with selected technology and

knowledge environments, such as Silicon Valley and Boston, to set up new knowledge links. The work to establish the Blue Ocean Innovation Arena involved linking up with robust environments in VR technology in France and the UK.



TURKISH COASTER FLEET RENEWAL PROJECT

The GCE Blue Maritime Cluster and Innovation Norway's office in Istanbul has for many years worked to lay the groundwork to allow Norwegian designers and equipment suppliers to be able to collaborate with Turkish shipowners and shipyards in terms of short sea vessels. Per Erik Dalen, CEO of GCE Blue Maritime Cluster recently went to Istanbul for a project meeting in the «Turkish Coaster Fleet Renewal Project».

The host of the meeting was the Turkish Chamber of Shipping, with whom GCE Blue Maritime signed an MOU in 2014. The Norwegian participants were the Norwegian Ambassador to Turkey, Mr. Vegard Ellefsen and representatives from Innovation Norway. There is a growing market for Norwegian design and marine equipment in Turkey.

IN2 FRAM TURKEY

During the spring of 2016, GCE Blue Maritime and Innovation Norway ran a new international programme for maritime equipment and service providers in the SMB segment. The programme was aimed at smaller companies wanting to establish themselves or expand their businesses in Turkey. 8 companies from the cluster participated in this year's programme.

STUDY TOUR TO THE OFFSHORE WIND HUB IN ESBJERG

In May, GCE Blue Maritime organised a study to Esbjerg in Denmark to learn more about offshore wind and marine operations associated with this industry. The programme has been developed in collaboration with Offshore Energy DK which is one of GCE Blue Maritime's former partners in the EU project, ECOWindS.

The purpose of the trip was to learn more about the offshore wind industry in Esbjerg, to establish contacts and to explore the possibilities of cooperative efforts with Danish partners. The principal focus was on maritime logistics related to offshore wind operations. A number of key players from Esbjerg's robust offshore wind cluster, such as DONG Energy, Vestas

and World Marine Offshore, took part in the programme through lectures, discussions and networking events.



GET INSPIRED!

One of GCE Blue Maritime Cluster's most important tasks is to create meeting places for inspiration, skills development and networking. We are the main organiser and co-host of a number of conferences and seminars. Our events are free of charge and represent a central component of what we offer to all of the businesses in the cluster. They have become an important meeting point for the entire industry.



ÅKP Innovation

Courses and seminars for students, entrepreneurs, growth businesses and SMBs

GCE Blue Maritime Cluster's seminars:

- With Inside Information
- GCE Technofocus
- GCE Human Factor
- MarSem

Conferences:

- GCE Blue Maritime Cluster's annual conference - the cluster conference
- Fosnavåg conference
- Haram conference
- Mørebenk conference

COLLABORATION WITH OTHER ORGANISATIONS

The GCE Blue Maritime Cluster collaborates with a number of organisations in the industry and business world on specific projects and activities. In Møre, we work closely together with Mafoss, Maritimt Forum Nordvest, Ungt Entreprenørskap (UE) NHO and LO. This is primarily in joint recruitment projects and providing knowledge to young people. We are also collaborating with the organisations «Norges varemesse» and «Nor-Shipping» in relation to Ocean Industry Talents, in which GCE Blue Maritime is a member of the Board.

GCE Blue Maritime is a member of both INTSOK and Norwegian Maritime Exporters (NME) and works with these industry organisations. INTSOK's Arctic and cold climate solutions is a project in which GCE Blue Maritime is a partner. In 2016, GCE Blue Maritime joined the Norwegian Association for Autonomous Vessels (NFSA)

MARITIME CLUSTER COOPERATION NORWAY - SOUTH AFRICA

GCE Blue Maritime, together with GCE Node and GCE Subsea, have contributed to the development of a South African maritime cluster programme. The South African Maritime Safety Authority (SAMSA) would like to benefit from Norwegian experiences related to cluster thinking. The initiative is being run by the industry itself and GCE Blue Maritime sees this as an opportunity to establish contacts both within the industry and with the South African authorities. South Africa has a central position as the «gateway to Africa» and its economy is expected to grow rapidly in the coming years.



CROSSOVER BETWEEN CLUSTERS IN THE REGION

Møre and Romsdal has many robust industry environments and clusters. The biomarine cluster Blue Legasea, the furniture cluster Norwegian ROOMS and the industrial cluster iKuben are examples of these. In a region where these clusters are important additions to the strong maritime industry, we are now looking for synergies between the various industry clusters. The key words are skill division and collaboration. Work is ongoing with several crossover projects, both between businesses and clusters and also purely inter cluster work.



SIKT 2016 – YOU HAVE MOMENTUM

The innovation power in the strong marine and maritime clusters in Sunnmøre were illuminated when Crown Prince Haakon invited young talents to the annual SIKT Conference at Campus Ålesund in oktober.

The SIKT conference is a unique venue where around 200 young executives and talent aged 20-40 years come together to learn, think aloud, exchange ideas and inspire each other.

The Crown Prince met with representatives from the Maritime and Marine clusters in front of the conference. Shipowner Stig Remøy from Olympic told about his experience as an entrepreneur and how he mobilized his driving force.

– It is an interesting environment for innovation in the Ålesund region. Time after time this area has shown that it can find momentum to rebuild after adversity. We want to bring some of this energy into SIKT, said Crown Prince Haakon.





GCE BLUE MARITIME'S ANNUAL CONFERENCE

Challenging times

The challenging times for the maritime industry left their mark on this year's cluster conference. In a demanding market situation, there was great interest in the fresh market analyses and the cluster analysis. Throughout the year, the shipping companies of the cluster have experienced big challenges over the financing of their activities, and especially with bond issues; and the 250 conference participants were first given a thorough status report from the bond market. Lars Kirkeby from Nordea Markets opened with a discussion of the way forward for restructuring the offshore industry and said there would be more restructuring.

A weakened NOK has been a bright spot for the export sector in 2016. Gaute Langeland, Principal Analyst with Nordea, was able to say that the Norwegian economy has begun to regain its strength. Unem-

ployment nationwide is on the way back down again, but even the western counties continue to be affected by the decline in the oil industry. Interest rates have probably reached their lowest level and it is expected that NOK will slowly and gradually appreciate in the future.

Lars Lysdahl of Rystad Energy pointed out that the sharp decline of investments in oil worldwide would lead to a downturn in production. Demand for oil continues to increase and according to Rystad, the market will be in balance during 2017/2018. Oil prices are then expected to strengthen. The annual cluster analysis this year from Menon Business Economics was thought-provoking for the maritime cluster in Møre. The companies of the cluster are not doing quite as well as other national and international environments. Its productiv-

ity is generally lower than that of the competition. Since 2009, production growth has come to a halt and operating margins have fallen substantially.

Torger Reve presented an analysis this year of the situation in the offshore shipping companies. The shipping companies have traditionally been the drivers in the cluster. He believes there will be consolidations and that local solutions are the best for the cluster. The next best would be for new national owners with a clear understanding of cluster activities. Should the shipyards be bought up by financial funds that would divide them up, that could cause permanent damage to the cluster.

The conference ended with a presentation on Innovation's Ecosystem by Ade Mabogunje of Stanford University.



NETWORKING ARENA

It is important to establish arenas where new knowledge can be shared and new networks

created. All of our events are open and participation is available to all businesses in the cluster.

Conferences:

GCE Blue Maritime's annual conference, the Haram conference, Fosnavåg conference and Mørebenk conference

Seminars:

SMB forum, With Inside Information, Tech Focus, Human Factor, Marsem

Courses:

Big Data, 3D modelling, Systems Engineering, Management in Restructuring.

KNOWLEDGE ABOUT POLITICAL PROCESSES

One important task for the cluster organisation is to provide companies with more knowledge about social and political processes in Norway and internationally that may impact them. The maritime cluster contributes with many jobs, great value creation and has extensive international experience; and it is important that its companies contribute their expertise to such processes. The Government's white paper on industry, the new ocean strategy, Maritime 21, and the regionalisation process are examples of areas they are involved.

THE MØREBENK CONFERENCE

On 18 January, the Mørebenk Conference was organised by NHO, the Chamber of Commerce for the Ålesund region and ÅKP. This is an annual dialogue meeting between Government politicians from Møre and Romsdal County and industry representatives. The theme of the conference was Municipality reforms and regionalisation. Grete Ellingsen, Deputy Minister for Local Government and Regional Development made it clear that municipality mergers are profitable. The challenges to the offshore industry and new ocean business development were also on the agenda during the conference.

BLUE THINK TANK

The big challenge in the situation of the market for certain sectors of the maritime industry has created uncertainty regarding the way forward. An initiative was, therefore, implemented to start a think tank where companies from across the maritime supply chain could meet to discuss future-scenarios. Companies from other academic and industrial sectors were also brought in to give a fresh impetus. During the course of 2016, six think tank sessions were held.

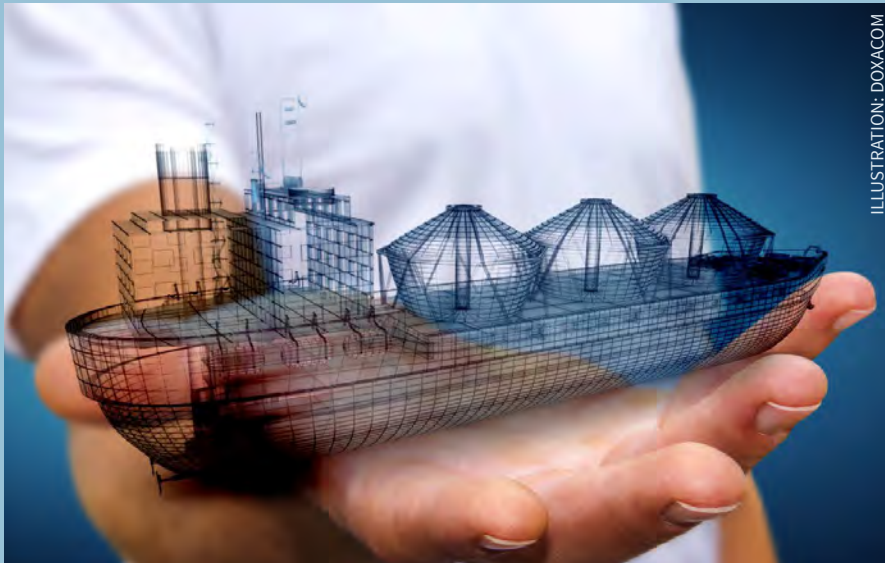


ILLUSTRATION: DOXACOM

PROFESSOR
ALBERTO SOLS

STRENGTHENING OUR EXPERTISE IN KEY AREAS

With major changes in the maritime industry in our region, the need for strengthening and expanding internal expertise has been great. The most important and comprehensive needs expressed by many of the companies are related to broader and more future-oriented technical expertise, which we have tried to meet with measures financed through GCE Blue Maritime.

Following on from the companies in the cluster responding very well to skills measures undertaken in 2015, several new skills-related measures were established for 2016. In partnership with Mafoss and in dialogue with major players in the industry, needs were determined and prioritised. In cooperation with several of the larger educational centres in Norway, a number of technical courses as well as those dealing with change management were scheduled.

3D MODELLING/VIRTUAL PROTOTYPING:

Following on from a request by the GCE Blue Maritime Cluster, NTNU Ålesund implemented its own course in the field of 3D modelling and visualisation. The course content was aimed at technical personnel from design and development environments in the cluster, and the response was very good. Efforts to simplify modelling processes with extensive

use of virtual prototyping and 3-D modelling has become increasingly important and critical in maintaining control over costs in design and development work. Within this discipline, the skills of already well-trained technical personnel within organisations is increased to enhance their innovation and future-oriented project activities.

Cooperation with NTNU Ålesund has been excellent in this field and the cluster companies have already reported a need for additional courses.

SYSTEMS ENGINEERING

In cooperation with the University College of South-East Norway and Professor Alberto Sols, a basic course in Systems Engineering (SE) has been established. A very great need has been defined in some companies for training in SE, and we also perceive that

the need is increasing. The course covers the fundamentals of the development of systematic and technical leadership of major internal processes and development work. Course participants carried out assignments in the subject, and more support is arriving from the companies to go on to undertake graduate studies in this discipline. Due to this very good response, an evaluation will be made of the applicability of further training courses in the subject.

RESTRUCTURING COURSES FOR MANAGERS

In view of the demanding restructuring processes expected in their organisations, several member companies have reported a need for greater expertise in change management. In cooperation with Magnar Hjertenæs of the faculty of Humanities & Education at Volda University College, a course of 8 sessions was established with the theme of leadership in challenging times. The central focus of the course was on restructuring processes and vulnerabilities in organisations undergoing change. The participants included management at various levels from Scana Volda, Kleven shipyard, Myklebust shipyard, Ulstein Power & Control and Ulstein shipyard. The response from participants as to the course concept and its relevance was excellent.





THE WORLD'S BEST SKILLED WORKER: – *An analysis of future skilled maritime workers*



**FREDRIK
LINGE KLOCK**

What skills and abilities should a skilled worker of the future have? And what does it need to take to get more young people to choose vocational courses? These are the main questions posed by Fredrik Linge Klock in his NTNU Master's thesis, which was commissioned by Mafoss with the support of GCE Blue Maritime. Klock is normally engaged in vocational training for the technical and construction sectors.

THE WORLD'S BEST SKILLED WORKER?

For the maritime industry in Søre Sunnmøre, and for industrial Norway in general, it is essential to ensure access to skilled labour at all levels to combat increasing competition from other countries. The costs involved in running the industrial sector in Norway are high, but the quality of work, delivery precision and development of equipment have led the world. For this to continue to be possible, there is one important prerequisite: that we ensure the

availability of skills at all levels. GCE Blue Maritime and Mafoss wanted to determine how to get good, young people to choose vocational courses and what competencies will be needed by the skilled worker of the future. Interviews were conducted in six different companies in the maritime cluster from april to june this year.

THE MAIN ISSUE IN THE STUDY HAS BEEN:

How can an individual company be certain to build up the necessary technical skills to ensure its competitive advantage by having «the world's best skilled worker»?

The survey was conducted as part of a Master's degree in International Business at NTNU in Ålesund.

The conclusions and recommendations are not yet fully complete, but there are a number of results that may well be worth mentioning:

- Most of those interviewed emphasised the importance of locally based workers
- In all the interviews, great importance was placed on the characteristics associated with positive attitudes, although this is not part of the concept of skills used by the Directorate of Education.
- At the various management levels in the companies, there were different understandings of, and opinions about, the expertise of a skilled worker. Organisational challenges were uncovered.
- The expertise of the skilled worker will have a direct impact on the individual company's competitiveness because expertise is one of the hardest things to duplicate.

A report will be prepared during 2017, which will be sent to the member companies of the maritime cluster.



GREAT ENERGY AT OCEAN TALENT CAMP

The region's largest recruitment event aimed at young people from secondary schools in Møre and Romsdal took place on 21 September at Campus Ålesund. 2,000 pupils and students met employees from all the maritime industry companies.

25 EXHIBITORS

At Ocean Talent Camp (OTC), students gain a good insight into training and career opportunities in the offshore industry. Around 25 businesses and organisations were exhibitors at this year's camp.

TEACHERS' LOUNGE

OTC Møre also arranged the Teachers' Lounge this year, where educators can take a breather, meet colleagues and receive information on the maritime industries. Two mini-seminars were held during the day, the topic of which was the market situation in the maritime industries.

COLLABORATION

10 secondary schools took part in this year's OTC Møre. The camp offers pupils an educational programme consisting of preparatory work, tasks during the visit and subsequent work that provides extra knowledge of working life and the society we live in. A talent test also helps you identify your own interests. The Ocean Talent Camp has gained a national reputation ever since this recruitment event was first held in Oslo in 2013. To date, 30,000 students across the country have attended the various camps.

The OTC Møre was arranged for the fourth time in 2016 and is a collaborative effort between Ålesund University College, Fagskolen i Ålesund, GCE Blue Maritime Cluster, Mafoss and Maritimt Forum Nordvest.

NRK-SERIES: MY PROFESSION

In cooperation with MAFOSS and three separate companies, GCE Blue Maritime has co-financed a short film in the series, «My Profession», which is a teaching series released by NRK (the Norwegian Broadcasting Corporation) for schoolchildren. In the film, shot in Sunnmøre, we meet engineers from Rolls-Royce, Kleven and the Ulstein Group who describe the paths they took to their professions. What these engineers have in common is that they have all taken General Technical Studies (TAF) in their Norwegian high schools, and doing this has been fundamental to their later career choices in the maritime industry. The film is actively used by MAFOSS and the member companies in the promotion of TAF as an important basis for further engineering training.



START FORUM 2016 – NTNU I ÅLESUND

150 delegates from all over Norway attended the spring gathering of the START FORUM in Ålesund. Start Norway is a Norwegian student

organisation founded in 2002 that works to promote innovation and entrepreneurship among students throughout Norway. In addition to NTNU in Ålesund, Start Norway is represented in all universities in the country, as well as in several colleges.

Members of Start are seen as being some of the most dedicated and innovative students in the country. Over three jam-packed days they got to experience our region and our business com-

munity. There were lectures, workshops and even a treasure hunt. All based on the theme of innovation.

START and other student organisations are important contributors to creating a vibrant and attractive student environment at Campus Ålesund. An attractive student environment is important for the maritime cluster in Møre and for this reason, GCE Blue Maritime Cluster made a strong contribution in organising the gathering.



«YOUR MARITIME FUTURE» – TECHNOLOGY AND ENGINEERING COURSE

GCE Blue Maritime Cluster and several leading companies in the cluster has for over 15 years organized a motivational course for the engineering profession. With the current downturn in the offshore industry it is more important than ever to show the young talent the rich possibilities in the maritime sector. In 2016, the course was held 8-12. February. The organizers were VARD, the

Ulstein Group, Kleven and Rolls Royce Marine, along with the organizations Mafoss and GCE Blue Maritime.

This year 13 top students from the secondary schools Fagerlia, Volda, Spjelkavik, Haram and Ulstein participated. The course provides a good introduction into the opportunities offered by the engineering profession in a world-leading maritime cluster. Using theory, visits to companies and social events, we hope to motivate young people to undertake advanced technical training and find a place as resource personnel in the maritime cluster at the end of their studies. Assessments of the course show that it is very well received by the students and that over 50 per cent of the participants go onto work as engineers.



A GOOD REPUTATION

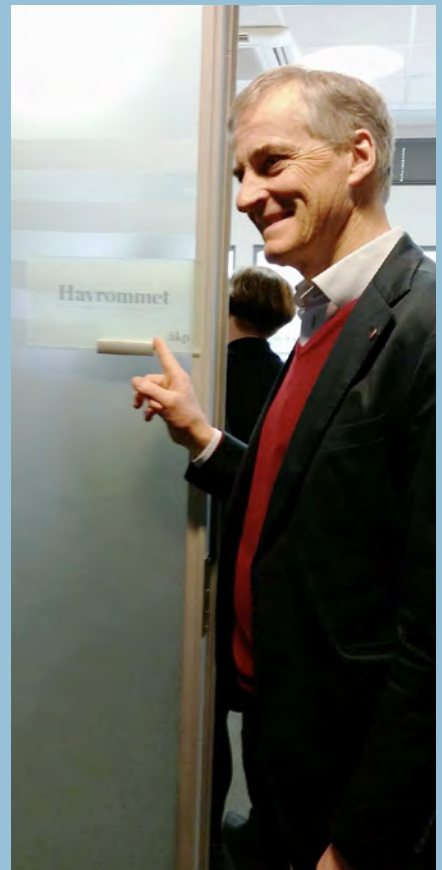
PRESS, HOSTING AND COMMUNICATIONS

Strategic positioning and branding are becoming increasingly more important to secure competitiveness for the future. Research shows that a good reputation increases corporate worth. A company's social responsibility, executive positioning and appropriate use of social media are perceived as important elements of a company's work.

In a global maritime industry characterised by fierce competition, a company's reputation can be critical to ensuring recruitment of talented and skilled workers, good market access and a good relationship with the press and interested organisations. The GCE Blue Maritime Cluster works actively to build a good reputation for its maritime cluster in Møre.

ACTIVITIES THAT STRENGTHEN OUR OVERALL REPUTATION:

- Contact with the press, and organised trips for the press
- Workshops in strategic positioning and branding
- Hosting delegations from home and abroad
- Marketing and communications activities
- Newsletters, websites and social media



BRAND NORWAY STRATEGY

Brand Norway is one of Innovation Norway's strategic priorities for the next four years and aims to develop a strong common brand for Norway. GCE Blue Maritime and the other ocean clusters will be a pilot project in this national initiative.

The project will contribute to increased growth and value creation by strengthening Norwegian export and ensure access to capital, knowledge, talent and tourists. One

wishes to unite business and government in a common and long-term commitment that will permit increased exports and economic growth across industries.

The project has defined five key focus areas:

- An aggressive export strategy for Norwegian goods and services
- A strategy to attract foreign investors, talents and tourists
- An adaptation of Innovation Norway tools
- Establish collaboration arenas
- Develop a Norwegian brand and communications platform

PRESS RELATIONS

A number of meetings are conducted annually with Norwegian and international press. This year's Blue C Press Tour was held in September. It gathered 12 international journalists from key maritime journals and from the news media. The maritime cluster in Møre is a very interesting place for journalists. The trip led to a number of articles and publicity from our companies.

DIGITAL MARKETING

Facebook, Twitter, LinkedIn and Google has for many years been used actively to build a good reputation for the maritime cluster in Møre. A new research and innovation project that looks at digital marketing in the marine industry has been implemented that aims to increase knowledge about new and important changes in this field. We will also offer workshops on digital marketing and targeted use of social media to the members of the cluster.

Find us at:

Twitter

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www.bluemaritimecluster.no



THE MARITIME CLUSTER IN MØRE

7OCEAN AS | AAS MEK VERKSTED AS | ACEL AS | ADIMA AS | AHLSELL NORGE AS AVD ULSTEINVIK | ALFR. NESSET AS | ALUDESIGN AS | AMECO AS | ARILD MORK INSTRUMENTERING AS | ASK SAFETY AS | ASPER NORWAY AS | ASTERO AS | ATLANTCONSULT MARINE AS | AUKRA MARITIME AS | AXTECH AS | BANDAK ENGINEERING AS | BARO MEK. VERKSTED AS | BAS ENGINEERING AS | BJØRDAL INDUSTRIER AS | BJØRSHOL MEKANISKE AS | BOURBON OFFSHORE NORWAY AS | BRASTAD SKIPSSERVICE AS | BRATTVÅG ELEKTRO AS | BRATTVÅG MEK. VERKSTED AS | BREIVIK MEK. VERKSTED AS | BRUDE SAFETY AS | BRUDE SERVICE AS | BRUNVOLL AS | CARIBE AS | CEBRUM AS | CFLOW AS | FISH HANDLING AS | DET NORSKE VERITAS AS | DEVOLD AMT AS | DOXACOM | ELMARIN AS | ELMO TEKNIKK AS | EMIL LANGVA AS | ERLING MYKLEBUST MEK. VERKSTED AS | ET HYDRAULIKK AS | FAGSKOLEN I ÅLESUND | FARSTAD SHIPPING ASA | FILTRA AS | FINNØY GEAR & PROPELLER AS | FISKERSTRAND VERFT AS | FLORVAAG ELEKTRONIKK AS | FORA FORM AS | FOSNAVAAG WELLBOAT AS | FRIONORDICA AS | FRONT SAFETY AS | FUPE SYSTEMS AS | FURUNO NORGE AS | GE RØR OG STÅL AS | GLAMOX ASA | GOLDEN ENERGY OFFSHORE SERVICES NORWAY AS | GURSKØY AS | HANS-PETTER BRATHAUG AS | HAREID ELEKTRISKE TEKNIKK AS | HAREID SKIPSSERVICE AS | HAST AUTOMASJON AS | HASUND MEK. VERKSTED AS | HATLEHOL PRODUKTER AS | HAVILA SHIPPING ASA | HAVYARD GROUP | HAVYARD DESIGN & ENGINEERING AS | HEIMDAL PROPULSION NORWAY AS | HELLAND RØR AS | HELSETH AS | HELSETH RØR AS | HENRIKSEN MEKANISKE AS | HG MARINE ELECTRONICS AS | HUSE ENGINEERING AS | HYDRA PIPE AS | HØGSKOLEN I MOLDE | HØGSKULEN I VOLDA | HØGSKOLEN I ÅLESUND | I.P. HUSE AS | ICD SOFTWARE AS | INDUSTRI OG SKIPSELEKTRO AS | INNOVASJON NORGE | INMARSAT SOLUTIONS AS | INPOWER AS | INVENTAS ÅLESUND AS | ISLAND OFFSHORE MANAGEMENT AS | ISOWEST AS | J. WEIBERG GULLIKSEN AS | JEMAR NORPOWER AS | JETS VACUUM AS | JOHN GJERDE AS | JOHNSON CONTROLS NORWAY AS REFRIGERATION ÅLESUND | KLEVEN | KONGSBERG DEVOTEK AS AVD ÅLESUND | KONGSBERG EVOTEC AS | KOPPERNÆSGRUPPEN | KRAEMER MARITIME AS AVD ÅLESUND | KRISTIANSUND ISOLERING AS | LANGSET TEKNIKK AS | LARSNES MEK VERKSTED AS | LIBRA-PLAST AS | LK VALVES AS | LUMINELL AS | MAFOSS | MARE SAFETY AS | MARIN TEKNIKK AS | MARINE RÅDGIVNINGSTJENESTER AS | MARINELEKTRONIKK AS | MARITECH SYSTEMS AS | MARITIM MOTOR AS | MARITIM MOTOR PRODUKTER AS | MARITIME AS | MARITIME MØBLER AS | MARITIME PARTNER AS | MARITIMT FORUM NORDVEST | MARITIMT MAGASIN | MAROFF CREWING AS | MASKINDYNAMIKK AS | MB HYDRAULIKK AS | MEDI 3 MARINE | MESTERPLAST AS | METIZOFT AS | MMC GREEN TECHNOLOGY AS | MOLDE JARNVAREFORRETNING AS | MOLTECH NORGE AS | MRF FJORD 1 AS | MYKLEBUST VERFT AS | MØRE MARITIME AS | MØRE OG ROMSDAL FYLKE | MØRE SVEISESENTER AS | MØRENOT AS | MØRE TRAFØ AS | NAVATEK AS | NEPTUNE OFFSHORE AS | NILS S. HANSEN AS | NOGVA MOTORFABRIKK AS | NORDEA | NORDVEST FORUM | NORDVEST MARIN AS | NORDVEST SVEIS AS | NORGES FORSKNINGSRÅD | NORWEST AAKRE AS | NYBORG AS | O. ØVERLAND AS | OFFSHORE & TRAWL SUPPLY AS | OFFSHORE SIMULATOR CENTRE AS | OLYMPIC SHIPPING AS | OPSTAD OFFSHORE AS | OSHAUG METALL AS | PARTNER PLAST AS | PLANY | PLATO AS | PLUGGFABRIKKEN TOR AS | PMC SERVI TECHNICS AS | POLYFORM AS | POWEX AS | PREPLAST INDUSTRIER AS | PROMARIN AS | R&M SHIP INTERIOR AS | RALF SKRAM AS | REGATTA | REKDAL INDUSTRIER AS | REM OFFSHORE ASA | REMØY MANAGEMENT AS | REMØY SHIPPING AS | ROLLS-ROYCE MARINE AS | ROSTEIN AS | RØRTEK AS | SALTHAMMER BÅTBYGGERI AS | SANCO SHIPPING AS | SANDBLOST AS | SCANA VOLDA AS | SEAONICS AS | SEBASTIAN AS | SERVITEC GROUP NORWAY | SEVI AS | SHALK ENGINEERING AS | SHAPE AS | SHIPADMIN AS | SKAMEK AS | SKIPSTEKNISK AS | SKORGENES SERVICE AS | SLETTA VERFT AS | SOLSTRAND TRADING AS | SOLSTRAND VERFT AS | SEMCO MARITIME | SPAREBANKEN MØRE | SPERRE INDUSTRI AS | SPERRE SVEIS AS **STADT AS** | STADT TOWING TANK AS | STEEL TECH AS | STP AS | STRANDA VERKSTED AS | VARD ACCOMODATION | VARD | VARD DESIGN | VARD ELECTRO | VARD PIPING | SUNNMØRE LIVBELTEFABRIKK AS | SVEISEREPARATØREN AS | SYKKYLVEN MASKINERING AS | SYKKYLVEN STÅL AS | SØLVTRANS HOLDING AS | TESS MØRE AS | THEMIS CREATE AS | TOMRA ENGINEERING AS | TOMREFJORD RØR OG MONTERING AS | TOOLS NORD AS | TRIPLEX AS | TUSSA INSTALLASJON AS | UKSNØY & CO AS | ULMATEC COMPONENTS AS | ULMATEC PYRO AS | ULMATEC SKIPSSERVICE AS | ULMATEC STROMEK AS | ULSTEIN DESIGN & SOLUTIONS AS | ULSTEIN POWER & CONTROL AS | ULSTEIN GROUP | UNDERTUN INDUSTRI AS | UPTIME INTERNATIONAL AS | VAAGLAND BÅTBYGGERI AS | VARDE AS | VEGSUND SLIP AS | VELLO NORDIC | VENTIQ AS | VESTNES ELEKTRO AS | VESTSINK AS | VIGOR KRISTIANSUND AS | VIK ELEKTRO AS | VIKE AS | VOLSTAD MARITIME AS | VULKAN SKANDINAVIA AS | WEST MARITIME AS | WESTCOAT AS | WESTING AS | WEST OIL TOOLS AS | WILHELMSSEN SHIPS SERVICE AVD SIS CONSULT (ÅLESUND) | WISE CONSULTING AS | ZENITH ELEKTRO AS | ÅLESUND DATA AS

13 DESIGN COMPANIES **19** SHIPPING COMPANIES

14 SHIPYARDS **170** SHIP EQUIPMENT SUPPLIERS

16 000 SKILLED EMPLOYEES

61.5 BILLION NOK IN TURNOVER (2016)



**BLUE
MARITIME
CLUSTER**

GLOBAL CENTRE OF EXPERTISE
NORWAY