

Breaking Waves

OPERATIONS REPORT 2015



GCE
Global Centres
of Expertise



BLUE MARITIME CLUSTER
ET PROGRAM I ÅKP



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





WE MUST EXPLOIT THE OCEANS OPPORTUNITIES

BY PER ERIK DALEN, GCE BLUE MARITIME CLUSTER

Norway is at a crossroads. The fall in the price of oil requires rapid readjustment and major cost reductions in the petroleum industry. This will be painful, but necessary. At the same time, this readjustment will also provide new opportunities as new and smarter solutions are being developed. Many of these will be used not just by the oil and gas industry, but also by neighbouring industries.

To create industrial growth offshore, the current Government must be as bold as its predecessors were in the 1960s and 1970s. When the Norwegian oil adventure started more than 40 years ago, almost all of the equipment and technology was American. Today, thanks to a deliberate policy, the Norwegian oil technology industry is a world-leading exporter.

Over the next 40 years we are facing an equally impressive maritime adventure. 70 per cent of the world's surface is covered by sea and 90 per cent of the sea is still unexplored. The oil and gas industries, the maritime industry and the marine industry have each produced some of the world's leading companies and innovations. The next step is to find out how these industries and companies can work together to solve problems that affect them all.

A degree of collaboration is already well under way. One example is the collaboration between SINTEF and SalMar regarding the development of giant cages positioned offshore, based on known technology from oil platforms combined with knowledge from the feed-stuff and aquaculture industries. Another is Kleven's agreement with De Beers Marine Namibia regarding the construction of a special ship for diamond exploration on the sea bed. A third is Ulstein's agreement with Siemens to build two supply vessels for offshore wind power facilities.

OECD is currently preparing a report entitled The Future of the Ocean Economy. This will be presented in Korea in April next year.

We are already seeing opportunities in emerging offshore industries, such as renewable energy, sub-aqua mining, offshore aquaculture, marine biotechnology, monitoring technology, and oil and gas activities in deep and ultra-deep water.

The maritime cluster in Møre has proposed to the Minister of Trade and Industry, Monica Mæland, that the OECD study is followed up with a Norwegian study in the course of 2016. In the longer term, a Norwegian Official Report for the maritime arena should be drawn up that can form the basis for long-term political and commercial priorities.

As one of the world's leading maritime nations, it is important for Norway to quickly begin and become a trendsetter for the sustainable and commercial exploitation of the sea.

We must reveal the risks and uncertainty regarding future development, identify which advances and R&D breakthroughs are necessary, determine the investments and skills needed for the future, assess the implications for climate and the environment, and assess the need for planning and regulations.

In its state of the nation address, the Government explained that it wants to prioritise measures that contribute to long-term realignment and the Governmental budget for the year was presented as a budget for work and readjustment. The downturn in the oil sector is freeing up many highly skilled people and this is one option for readjustment by Norway that we must make use of.

Norway has demonstrated that it can create exciting growth based on our natural resources and a deliberate policy of knowledge and industrial development. We can do it again. To highlight the fact that Norway is heading into a new area, Ålesund has offered to host the Government's national maritime conference in 2016. Our aim is to have the conference mark the start of a new Norwegian adventure at sea.

BLUE MARITIME CLUSTER

Global Centre of Expertise

This maritime cluster at Møre is a world leader in design, construction, equipment and operation of specialized service vessels for the global offshore energy industry. In 2014, due its unique global market position and its important contribution to Norwegian value creation, the cluster was 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 and rapidly growing 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

¹ «A cluster is a geographical proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and externalities».

(M. Porter 1998)

8 SMART GOALS

The cluster project Blue Maritime has 8 smart goals that we work by. These are SMART because they are Specific, Measurable, Ambitious, Realistic, Time-related

- 1: Increased rapidity 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.

THE BLUE MARITIME TEAM

The GCE Blue Maritime Cluster project is run by innovation company ÅKP AS and can therefore draw on the extensive expertise and excellent network in this knowledge environment. The project is managed by a distinguished and balanced steering committee, consisting of key people from the maritime business in the region, county and Aalesund University College.

This means that the team working with GCE Blue Maritime Cluster is highly flexible and is able to react quickly, whether to challenges from the Norwegian or international business community, or to input from the knowledge environments. It means we are well positioned to create new opportunities for the Møre maritime cluster.

Per Erik Dalen

CEO of ÅKP and
GCE Blue Maritme



Frank Støyva Emblem

Director Communications



Hans Petter Hildre

Director - Innovation,
Research and Education



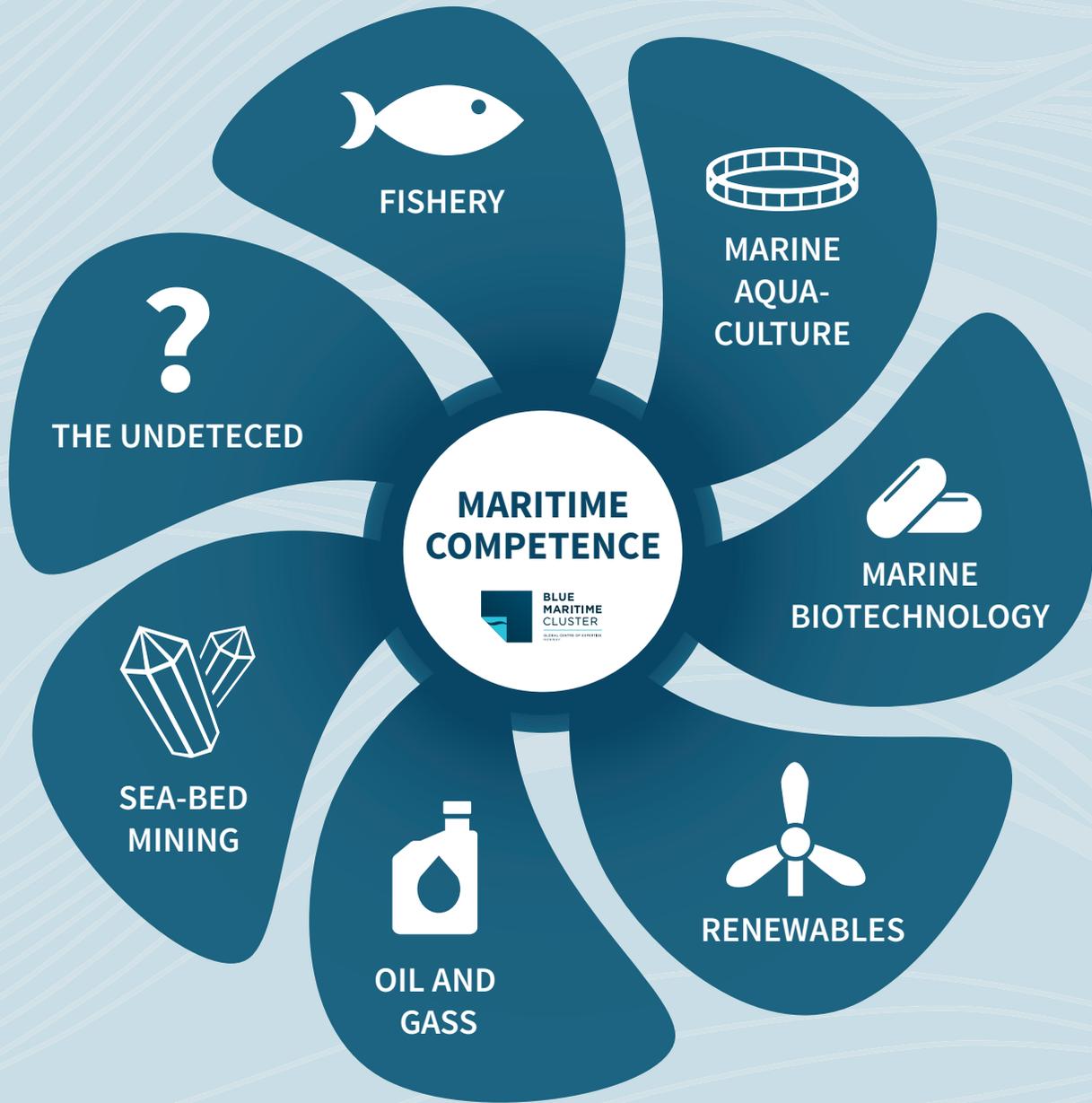
Kjell Moltu-Jacobsen

CFO



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



THE FUTURE LIES IN THE DEEP BLUE OCEAN

For many generations, the Blue 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 per cent 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.

The ambition of the maritime cluster in Møres is to become a global hub for the safe and sustainable commercialisation of offshore activities. 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'.

CLUSTER VALUE ADDED 2014



TURNOVER

7 %
Development
(2013/2014)

VALUE ADDED

8 %
Development
(2013/2014)

OPERATING MARGIN

-13 %
Development
(2013/2014)

EMPLOYMENT

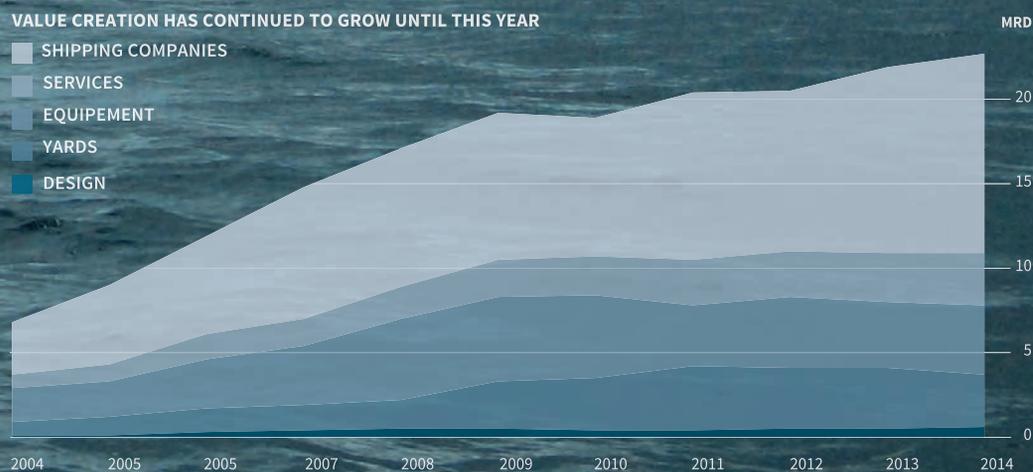
0,6 %
Development
(2013/2014)

BLUE MARITIME CLUSTER IN GLOBAL COMPETITION

The maritime cluster in Møre has become the subject of a wide range of analyses, amongst others the annual cluster analyses from Møre research that go back to 1988. The knowledge regarding a number of businesses, turnover development, exports, internal suppliers and other interaction within the group is well documented and unique in a Norwegian context. But few analyses have been carried out that compare the services of the Møre cluster with other leading companies in the world.

Even though the Møre cluster has experienced very strong growth and extensive international success over the last 10 years, it is important to be aware of the fact that this development coincides with powerful global growth in the construction and operation of offshore vessels and that Norway's share of the global offshore market has not increased in the period.

The steering committee in the GCE Blue Maritime Cluster therefore decided to carry out a new global performance benchmark analysis to compare the cluster's development with its most important competitors. The analysis was carried out by Menon Business Economics and was presented by Erik W. Jacobsen at the cluster conference on 25 September 2015.



Menon Business Economics 2015

ERIK W. JAKOBSEN
Menon Business Economics



HIGHLIGHTS FROM THE GLOBAL PERFORMANCE BENCHMARK ANALYSIS

MENON BUSINESS ECONOMICS - SEPTEMBER 2015

STRONG GROWTH

Companies in the Blue Maritime Cluster demonstrated spectacular growth from 2004-2014 with the total value added increasing, on average, 13 percent annually and reaching NOK 23 billion in 2014. As a result, more than 8,000 new jobs were created in the cluster. That said, by all measures, growth has slowed down significantly in the period from 2009-2014.

PRODUCTIVITY IS HIGH, BUT DECLINING

Productivity in the cluster is high compared to similar industries in other countries and is in line with similar maritime businesses in Norway. But growth in production stopped after 2009.

SHIP DESIGN AND SHIPYARDS ARE PERFORMING BEST

Ship design and ship construction have shown the best development, especially in recent years. It is also these industries whose global market share is highest:

- At least a third of all advanced offshore vessels are constructed using Møre designs
- 17% of all advanced offshore vessels have, over recent years, been supplied

from shipyards in Møre. 12% of current orders for advanced OSVs have been commissioned from shipyards in Møre.

WEAKER DEVELOPMENT AMONG EQUIPMENT MANUFACTURERS

Overall, equipment manufacturers have experienced very weak development over recent years and have declined in terms of growth, profitability and market share. It is primarily Rolls-Royce that appears to have declined in terms of competitiveness and which has lost out overall. The other equipment manufacturers are doing well.

SHIPPING COMPANIES HAVE INCREASED THEIR MARKET SHARE

The shipping companies have increased their market shares, but have seen weaker development than their Norwegian competitors over the last three years. After the fall in oil prices, it appears that the most advanced and specialised shipping companies are losing out the most, as their cost base is higher than that of their competitors (see 4b below).

INCREASED COMPETITION FROM ASIA

The cluster's global market share appears to be falling. There are several explanations for this:

- Measured in terms of the number of

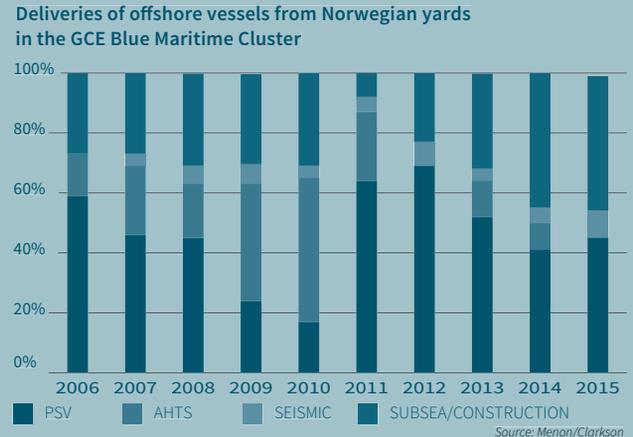
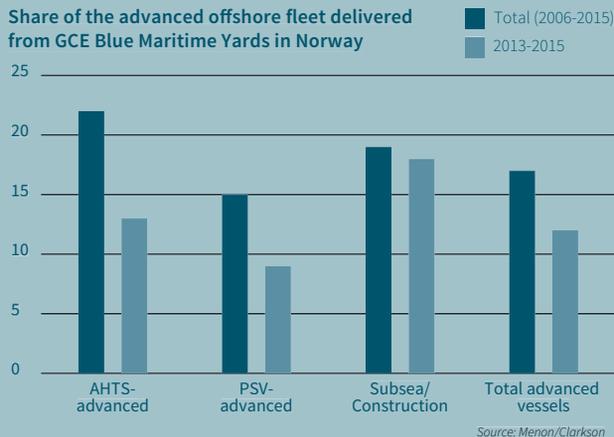
ships, the offshore vessels' share of the total number of new ships built increased from 6% in 2005 to 18% in 2013, 2014 and 2015 (in terms of value, the share is even higher). The large volumes attract the large Asian shipyards.

- Ships and equipment are gradually becoming more standardised. The cluster's strength lies in advanced, specialised ships that are manufactured and operated on a small scale. The benefits of specialisation are most apparent during periods of revival. When supply is greater than demand, specialist companies lose their competitive advantage as they are competing in areas the products are not specifically designed for.

COMPETITIVENESS UNDER DOUBLE THE PRESSURE

The cluster's competitiveness is experiencing double the pressure, for two reasons:

- The competition from standardised manufacturers of mass-produced goods in low-cost countries is increasing
- The entire offshore industry is becoming steadily more cost and price-oriented. The oil companies must reduce their costs substantially, and this pressure has a downward impact on all oil and gas-related value chains.



On the other hand, it is conceivable that individual high-end niches in which the Møre businesses operate, such as sub-aqua/construction, may be less exposed to competition than the broader segments.

REQUIRES READJUSTMENT AND INNOVATIVENESS

There is reason to believe that the maritime cluster in Møre faces some challenging years

in the future, not only because of the weak markets, but also because the sources of its competitive advantages are less relevant in today's weak market situation than in the years of revival that are behind us. At the same time, the cluster as a whole has an ability to innovate and readjust that can be used to adapt in the current situation, and develop new products and services for other areas of application in the offshore arena, connected in particular

to fishing, aquaculture, offshore wind power and other specialised maritime operations.

Innovativeness is down to the following in particular:

- high level of local ownership
- the combination of experience-based and research-based skills
- openness, faith and a long tradition of collaboration.

Overview of the results in the report

DECELERATING GROWTH
ACTIVITY <ul style="list-style-type: none"> • 13% annual growth in value added • Value creation reach 23 billion • >8000 new employees since 2004
PROFITABILITY <ul style="list-style-type: none"> • Declined by 5 pp for cluster since 2008 • Volatile operating margins • Significant differences across segments
PRODUCTIVITY <ul style="list-style-type: none"> • Grew by 1% annually since 2009 compared to 92% annual growth in 2004-2009
MARKET SHARES <ul style="list-style-type: none"> • Shipping ↑ • Shipyards → • Equipment ↓

MARKET PRESSURE
OVERCAPACITY <ul style="list-style-type: none"> • Offshore fleet has nearly doubled since 2004
FALLING DEMAND <ul style="list-style-type: none"> • 50% decrease in the oil prices • 23% reduction in the number of active rigs worldwide
INCREASED COMPETITION <ul style="list-style-type: none"> • Lower demand for advanced ships • 80% of OSV are built in Asia • Worse relative cost position
HIGH FINANCIAL RISKS <ul style="list-style-type: none"> • International OSV companies have 38% lower leverage • High counterparty risks for shipyards

STRATEGIC CHALLENGES
INTERNATIONAL & PRODUCT DIVERSIFICATION to reduce exposure to NCS and/or offshore oil & gas industry
IMPROVING OPERATIONAL EFFICIENCY to improve the cost position and remain competitive on price
MANAGING THE CAPACITY to reduce costs in the downturn and be able to increase capacity when the conditions improve
MANAGING COUNTERPARTY RISK AND FINANCIAL DISTRESS RISK



ON TOP OF INDUSTRIALLY ORIENTED R&D

The Blue Maritime Cluster in Møre has, for a long time, strongly focused on the interaction between research, training and industry. Ålesund University College 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. Every ship is more or less a prototype. 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

182 million on R&D in 2014. Of this amount, only NOK 3.3 million was received as a public subsidy (1.8%). Every year, Rolls-Royce Marine spends somewhere between NOK 200 and NOK 300 million in the cluster. Figures from Brunvoll show that it spends around NOK 50 million. 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, even though no overall summary is available. However, a number of indicators tell us something about its scope. 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. Innovasjon Norge 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 2014, the total amount committed (in loans and grants) by the organisation was almost NOK 1 billion. 1 in 4 loans from Innovasjon Norge are to industrial businesses in Møre and Romsdal.



SFI MOVE - MARINE OPERATIONS

In 2014, Ålesund University College was awarded the prestigious status of Senter for Forskningsdrevet Innovasjon (SFI) (Centre for Research-based Innovation). This is an eight-year research programme with a budget of NOK 200 million.

MAIN OBJECTIVE:
TO ESTABLISH A WORLD-LEADING RESEARCH AND INNOVATION CENTRE FOR DEMANDING MARINE OPERATIONS.

SFI MOVE - Marine Operations shall develop knowledge, methods, tools, technology, prototypes and training for a safe, robust and effective installation of structures and maintenance of equipment in extreme sea conditions. Technology and methods shall open the door to new opportunities for Norwegian industry and other partici-

pants through operations in the Arctic, in deep waters, the installation of wind turbines, and mining on the seabed. For Norway, new knowledge and innovation with respect to advanced marine operations are crucial for large-scale industrial development and increased value creation in the ocean industries.

BUSINESS AREAS

- Most demanding marine operations – sub-sea, Arctic, all year
- Offshore wind operations – installation and service
- Seabed mining operations - innovation

PARTNERS: RESEARCH PARTNERS:

Ålesund University College, NTNU, MARINTEK AS and SINTEF Fiskeri and Havbruk AS.

MARITIME CLUSTER:

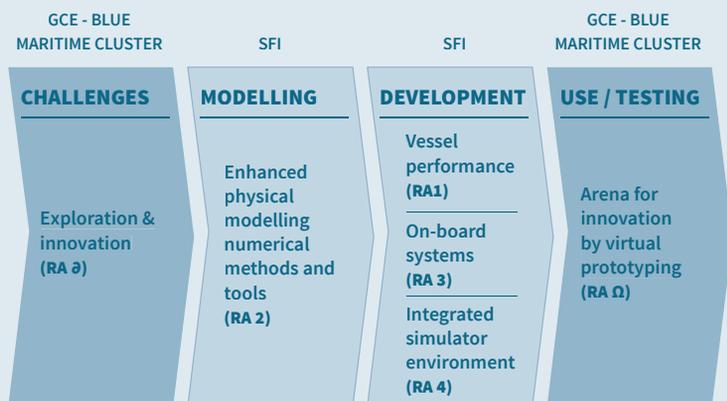
Farstad Shipping ASA, Olympic Shipping AS, Havila Shipping ASA, Rolls-Royce Marine AS, Brunvoll AS, Ulstein International AS, GCE Blue Maritime Cluster, Offshore Simulator Centre AS.

OIL AND GAS OPERATORS AND SUPPLIERS:

Statoil Petroleum AS, Subsea7 Norway AS, AMAS-AMC AS, Statkraft AS, Ocean Installer.

INTERNATIONALLY:

University of São Paulo.





CAMPUS ÅLESUND IS GROWING

Norwegian Maritime Competence Centre (NMCC) has been a success for the maritime and marine industries in Sunnmøre. The owners are now investing NOK 500 million and are expanding the premises by 15,000 square metres.

NMCC is centrally located on Campus Ålesund and was officially opened by Crown Prince Haakon in 2012. Today, the centre is an important meeting place for skills and development within the maritime and marine industries. It currently provides around 800 jobs, dispersed over 23,000 square metres. Amongst others, Rolls-Royce Marine has its technology and training centre here. Other tenants include ÅKP, Møreforskning, Aker Solutions, Offshore Simulator Centre, Sintef, Brattvaag Elektro, etc.

INVESTMENT DURING TIMES OF RECESSION

The construction process itself started in November 2015 and the building is expected to be ready to move into by the autumn of 2017.

«Of course, we are not blind to the current negative reports from the maritime, oil and gas industries, but we believe that, in this context, we must look far into the future», says Chairman of the Board at NMCC, Leif Arne Langøy.

BRINGS TOGETHER TRAINING WITHIN MARITIME OPERATIONS

Ålesund University College (NTNU Ålesund) has signed a lease contract for

the fourth floor in the new NMCC2 building. The plan is that all of the nautical businesses, including all of the simulators and course-centred maritime operations, will be located in one place from the start of studies in 2017/2018.

«The project will consolidate us as a leading national environment for maritime training, research and course activity. This specialist environment has acted as a vanguard for Ålesund University College, and has now acquired an important role in NTNU's strategic investment in the oceans», says Marianne Synnes, Principal of Ålesund University College.

SEVERAL NEW TENANTS

Along with NTNU Ålesund, the county municipality also wishes to move the VG2 maritime classes at Ålesund Secondary School and Ålesund Technical College to the new building. The international group, Inmarsat Solutions, will also be moving into the building, as well as Blue Ocean Innovation Arena AS.

NTNU ÅLESUND

In January 2016, NTNU will merge with the university colleges of Ålesund, Gjøvik and Sør-Trøndelag. The new university will be Norway's largest with 38,000 students and will offer a more complete range of study options and more extensive research facilities. The new NTNU shall be an internationally-oriented university and a multi-campus university with its main location in Trondheim and campuses in Ålesund and Gjøvik. Its main focus will be on technology and natural sciences, but there will also be a large number of other departments, including humanities, social sciences, economics, medicine, health sciences, business studies and fine arts. The aim is to raise natural science and technology education in Norway to a high international level.



BLUE OCEAN INNOVATION ARENA AS

ÅKP and SIVA are setting up a new company that will contribute to implementing the future's open innovation arena on Campus Ålesund. Blue Ocean Innovation Arena shall be a shared innovations infrastructure for the whole of the marine industry. The arena shall include the enabling technological fields of virtual prototyping, big data and 3D Cave. A high-speed incubator for entrepreneurs and growth businesses will also be established.



GCE BLUE INNOVATION GRANT

Three million for promising innovation projects in the cluster

The maritime businesses in Møre are now encountering challenging market conditions. At the same time, we are well aware of the considerable possibilities for the future in the offshore arena. Many businesses require a readjustment, new business models and increased innovation to meet the challenges. The innovation company ÅKP and the cluster project GCE Blue Maritime Cluster would like to assist with readjustment and innovation and announced, therefore, in October 2015 support amounting to NOK three million for idea and project development, mobilisation of innovation projects, readjustment projects and potential projects.

EARLY FINANCING FOR INNOVATION PROJECTS

In concrete terms, this means that businesses can apply to GCE BLUE Maritime Cluster for funds to progress ideas for new products, ser-

vices, areas of use and production methods, and to provide the necessary clarifications for any decisions to prioritise further work and resources for the project. These can also be pilot projects for large research and development projects.

GCE Blue Maritime Innovation Grant supports projects within the following areas:

- virtual prototyping/manufacturing
- big data
- new products or services
- new business models/markets
- development of new green projects/services
- conversion to more environmentally-friendly operations

GCE Blue Maritime Cluster received 18 applications for Blue Innovation Grants and approved grants for six projects.

ÅSGARD SUBSEA GAS COMPRESSION SYSTEM

Pioneers in the simulation of advanced subsea operations

Autumn 2015 saw the last module for Statoil's gigantic subsea compression plant in the Åsgard field assembled off the Norwegian coast at a depth of 265 metres. The construction is the size of a football pitch and comprises 22 modules, of which the largest weighs 300 tons. Both the frame and the modules are too big to install in a traditional dry or floating dock, and the preparations for the lift were therefore simulated in a fully integrated subsea simulator at the Offshore Simulator Centre (OSC) in Ålesund. The operation was a great success according to Statoil.

«Extremely good preparation – simulating in Ålesund has paid for itself at least tenfold!»

Ole Jørgen Johansen – Project Manager Åsgard Subsea Gas Compression at Statoil.

The simulator training was carried out on a complete ship's bridge with all the relevant controls and systems. Using this, the instructors can, with a few small adjustments, create a small storm, change the wave height or send in a helicopter to land on the ship that is carrying out the lift.

«Never before has a simulation exercise of such size and significance been carried out. Integrated lift exercises were included for the bridge, crane and ROV. In total, over 100 people were trained with simulators in preparation for operations in the Åsgard field», says Joel Mills, Managing Director of OSC.

The fact that the training can be made realistic in simulators represents a large financial saving for the operating companies. According to OSC, the entire simulation costs about 2 per cent of the costs of a traditional exercise.

An important task for the cluster programme GCE Blue Maritime Cluster is to help finance the shared technical infrastructure of the cluster. With the help of the innovation framework for Norwegian Innovation Clusters, the Offshore Simulator Centre in Ålesund received NOK one million in 2014 for the development of a subsea simulator that was used for the Åsgard operation, amongst other things.



JAN THORMODSÆTER
Project Manager



THE COMPETANCE PROJECT 2015

The steering committee of GCE Blue Maritime Cluster reported earlier in 2015 that there is a need for new competence during the coming downturn in the maritime industry. In the same period, the Søre Sunnmøre Maritim Association (MAFOSS) received worrying reports from several businesses regarding severe limitations in next year's apprenticeship admissions. In light of this common awareness of the situation, the decision was taken to establish a joint competence project. The first stage was to implement a round of interviews and carry out a survey to map the needs and desires with respect to measures to increase skills in the industries.

- «The businesses reported back that in the challenging times ahead it was important to retain and strengthen the skills of their employees. Our task is to provide the basis for measures to increase skills in the businesses», says project manager Jan Thomodsæter.

In tandem with the survey, talks were held with providers to set up courses, seminars and training sessions aimed at maritime businesses. In addition, work was carried out to clarify with NAV the use of funds for

training in combination with unemployment compensation/lay-offs.

The businesses reported different requirements, but there was also a clear need for some specific measures, and some areas were specifically identified.

YOUNG PEOPLE/APPRENTICESHIPS:

In collaboration with the regional municipalities of Møre and Romsdal, MAFOSS established a pilot project which gathered apprentices from Rolls-Royce Marine, the Ulstein Group and Kleven for an intense period of courses throughout the autumn and into part of winter. They rotated between the different businesses during this period, and were involved in production work with specific work for the various participants. The pilot project was very well received and the project may have the potential to produce a standard solution for how to resolve learning challenges in recessionary times in other parts of the county and within other industrial contexts.

SKILLED WORKERS/PRODUCTION WORKERS:

The businesses reported back that there was a need to send skilled workers on courses

and/or for further training during temporary leaves of absence, but to wait until after restructuring. Specific measures will be reassessed in 2016.

ENGINEERS/TECHNICAL PERSONNEL:

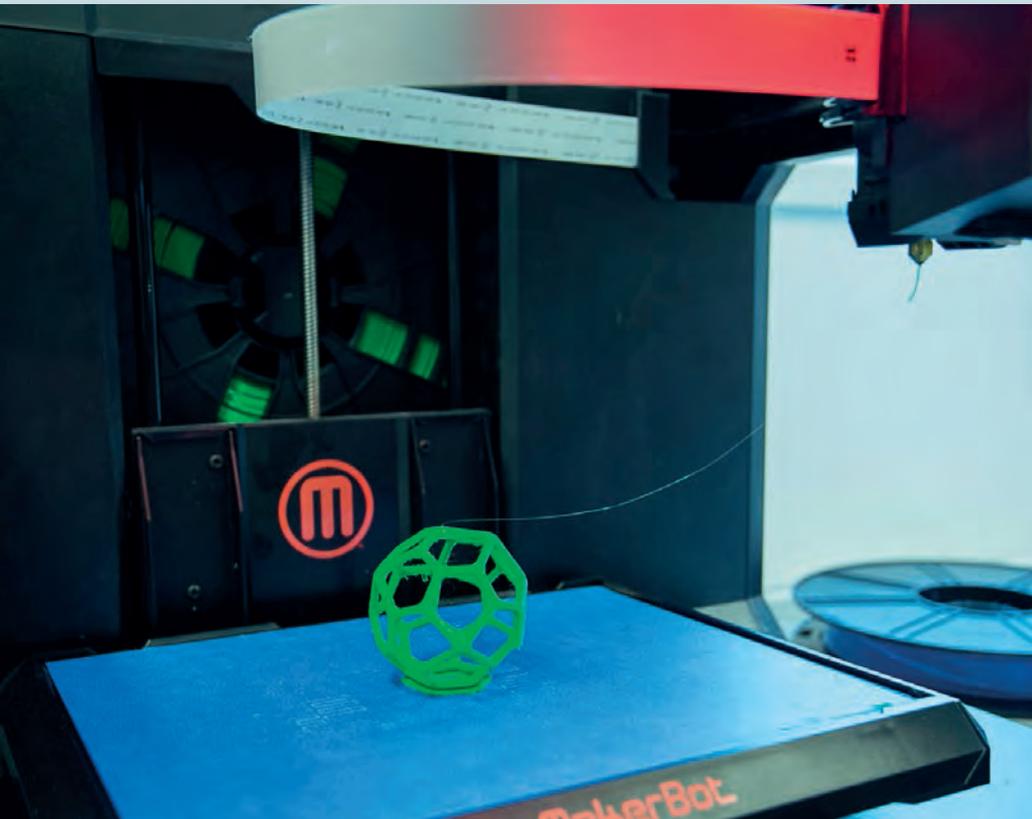
The survey revealed a need for the training and further training for engineers. In collaboration with Ålesund University College, we have prepared a course prospectus with courses that will start in autumn 2015 and spring 2016.

MANAGEMENT:

In autumn 2015 a restructuring package was prepared for managers in maritime industries with topics such as finances, leadership, law and marketing. Three course days on strategic positioning and marketing were held in 2015. New management courses are scheduled for 2016

R&D:

In this area, most businesses reported a significant need for courses on systems for grant schemes and specific tips for writing applications to be submitted for public funding. Several seminars were held in 2015 and more are scheduled for 2016.



STRATEGIC POSITIONING AND BRANDING

Many businesses are now engaged in a process of readjustment and strategic positioning, a process in which branding and communication are important disciplines. Over the course of the year, GCE Blue Maritime has invited all of the businesses in the cluster to a free, half-day course covering these topics. The courses are based on the individual company's marketing challenges. The aim is for the participants to become more confident with their own marketing work and to recognise how offshore activities can be used in their own branding. The course should provide inspiration and information on best practice from some of Norway's best in the field. Businesses receive specific input regarding their own plans - with respect to customers, in marketing material, in the media and with respect to their own employees.



Few things are progressing as quickly as the digitalisation of our society. According to IBM, 90% of the data available in the world today has been created over the past two years. Enormous amounts of data offer huge opportunities, and knowledge of big data is increasingly important. Insight into and analysis of large amounts of data are considered crucial factors for maintaining and increasing competitiveness in the years ahead.

Within the maritime sector, the Big Data analysis is a tool for reducing risks,

making better decisions, reducing downtime and planning maintenance.

GCE Blue Maritime Cluster and Ålesund University College have set up a series of courses in which lectures and concrete «cases» from the maritime industry will show how analysing large quantities of data, using different variations of data types, calculating the reliability of data and using data in real time can influence how we position ourselves with respect to the future. The first course started in November 2015.

WIDE RANGE OF COURSES

Since the spring of 2015, GCE Blue Maritime Cluster and Mafoss have been collaborating to put in place various measures to enhance the skills of managers and other employees in the maritime cluster. In collaboration with Ålesund University College and other course providers, a course prospectus was prepared in the autumn of 2015 with specially adapted and meeting-based courses and seminars within the fields of big data, virtual prototyping, 3D modelling, systems engineering, manager development and strategic communication. The courses are being offered to both employees and staff on temporary leaves of absence from the businesses and are largely financed by GCE Blue Maritime Cluster.

The first courses started in autumn 2015 and many others will follow in 2016.



GCE BLUE MARITIME'S ANNUAL CONFERENCE

Pioneering the Blue

A lot was expected from this year's cluster conference. In a challenging market situation for many maritime businesses, there was great advance interest in the new market analyses and cluster analyses. A record number of participants had registered and there were long waiting lists this year.

The 250 participants assigned a place first received an introduction by Karl Almås who is a member of the steering committee of OECD's «The Future of the ocean economy project». This project will provide guidelines for the policies of many countries for years to come and will have consequences for how the oceans' resources are used.

Deep sea mining is an interesting market segment, but one that has seen little devel-

opment hitherto. Dr Steffen Knodt from the Deep Sea Mining Alliance in Germany explained how the work is carried out, who is involved and how this is likely to develop in the years to come.

Chief Analyst at Nordea Markets, Gaute Langeland, said that Norway was in the throes of a tough, extensive and deep recession. Interest rates are on their way down and the Norwegian krone will remain at a low level for a good while yet. This is good news for export businesses in an otherwise difficult situation. Lars Lysdahl from Rystad Energy stressed the sharp stop in oil investments and the extensive overcapacity of offshore service vessels. But the price of oil will increase and reach USD 100 per barrel in 2020, according to forecasts from Rystad Energy.

There was a lot of excitement before the new cluster analysis was announced. For the first time, the maritime cluster in Møre was compared to national and international competitors. Menon Business Economics carried out the analysis work. It shows that the cluster has enjoyed colossal growth since 2004 and has more than trebled its turnover in ten years. The number of employees has increased by 7,000 in the period. Since 2009, however, production growth has halted and operating margins have fallen substantially. The cluster's businesses are clearly doing better than their competitors, but there are signs that their lead is about to be whittled away.



MEETING PLACES AND NETWORKS

One of GCE Blue Maritime Cluster's most important tasks is to create meeting places where new knowledge can be shared and new networks created. All of our events are open and participation is offered to all businesses in the cluster.

CONFERENCES:

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

SEMINARS:

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

COURSES:

Strategic positioning and branding, big data, virtual prototyping



TECH FOKUS

Three full-day Tech Focus seminars were held in 2015 on the subjects of maritime condition monitoring, maritime lighting and smart production. In June, ÅKP and the college hosted a visit from Professor Nils Henrik Mortensen and his team from Denmark's Technical University in Copenhagen. Mortensen and his staff held a very interesting seminar on the subject of new production methods and how businesses can develop customer-adapted products at the same cost as mass-produced goods. The seminar was held under the title Tech Focus and interest was enormous with approx. one hundred participants. Over 200 people took part in Tech Focus in 2015.

GCE BLUE MARITIME CLUSTER'S ANNUAL MEETING

The first annual general meeting of the GCE Blue Maritime Cluster was held on 25 September 2015. The agenda included adoption of the statutes, election of the steering committee and information regarding activities. The new chairman of the steering committee is Gunnar Hareide.

WITH INSIDE INFORMATION

Over the year, a total of four seminars have been organised in the series entitled With Inside Information. The seminars provided updated market information on countries and regions such as Turkey, East Asia, the Americas, Russia, Germany and the Netherlands. Some of these have been arranged in collaboration with Innovasjon Norge, and the series of seminars will be continued next year. Well over 100 people took part in the seminars in 2015.



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 big data environment and NCE Smart Energy in Halden, and the

oil technology environments GCE Node and GCE Subsea. The excellent collaboration with NCE System Engineering Kongsberg and the manufacturing environment concerning NCE Raufoss is also on-going. The clusters have complementary technology skills and a range of common challenges. The leaders of the clusters meet on a regular basis.

INTERNATIONAL NETWORKS

Last year, GCE Blue Maritime Cluster worked with selected technology and knowledge environments, such as Silicon Valley and Boston, to set up new knowledge links. The work to establish Blue Ocean Innovation Arena involved linking up with powerful environments with in VR technology in France and Great Britain.

CLOSE COLLABORATION

GCE Blue Maritime Cluster collaborates with a number of organisations within the industry and business world on specific projects and activities. In Møre, we collaborate closely 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 Cluster chairs the board.

GCE Blue Maritime Cluster is a member of both INTSOK and Norwegian Maritime Exporters (NME) and works with these industry organisations. INTSOK, which is an amalgamation of Norwegian oil and gas partners, provides analyses to the annual conference and is a sparring partner in different projects. We have collaborated with NME in relation to different international trade fairs.

LEGASEA, NORWEGIAN ROOMS AND IKUBEN

Møre and Romsdal has many strong industry environments and clusters. The biomarine cluster 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 different 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.

GLOBAL INNOVATION WINNERS

What does it take for a Norway-based enterprise to become a winner on the global market? How can the clusters help Norwegian enterprises utilise new knowledge, increase the rate of innovation and become more effective? Along with several other Norwegian technology clusters, GCE Blue Maritime is taking part in the «Global Innovation Winners» project. One of the aims of the project is to create awareness in the cluster of the critical success factors that characterise global innovation winners and how we can utilise their knowledge. «In the maritime cluster in Møre, we have a number of «global innovation leaders»



amongst our partner enterprises, but we can still improve by learning from the best innovation environments in the world. We want to link up with world-leading skills environments such as Silicon Valley and Boston in order to increase our knowledge and define some specific, shared R&D projects», says Per Erik Dalen of GCE Blue Maritime Cluster.

Several workshops and collaboration projects have been held and implemented and more are in the pipeline. On 17 March, the internationally recognised innovations expert and author Tristan Cromer took part in a seminar

in Ålesund that attracted numerous cluster enterprises and entrepreneurs.

For the clusters, it was all about understanding the global framework conditions and mega-trends so that the enterprises can capitalise on «Norwegian advantages». The clusters must improve skills and help the partner enterprises establish collaborations between the Norwegian clusters and also with the world-leading skills environments. If we want to be one of the best, we must collaborate with the best. Nationally and internationally.



NTNU

In 2016, NTNU will merge with the university colleges in Ålesund, Gjøvik and Sør-Trøndelag. The new university will be Norway's largest, with 38,000 students, and will offer a more comprehensive range of study options and greater research facilities. The merger will mean that the industry clusters in Møre and Raufoss will be linked even more closely to Norway's most important technological research environment.



TURKISH COASTER FLEET RENEWAL PROJECT

GCE Blue Maritime Cluster has, for many years, worked to lay the groundwork for Norwegian equipment suppliers to be able to collaborate with Turkish shipowners and shipyards. In July, a workshop was held in Istanbul with a view to securing Norwegian participation in its «Turkish Coaster Fleet Renewal Project». This was addressed by the management of the Turkish Chamber of Shipping, with whom GCE Blue Maritime signed an MOU in 2014. The Nor-

wegian participants were GIEK, Eksportkredit and representatives from the maritime cluster in Møre. Turkey has put in place a good «acquisition scheme» that will help ensure that its coaster fleet is replaced with new, modern vessels. Norway can contribute financing for this construction programme linked to Norwegian equipment packages. The parties are still in dialogue.



OCEAN TALENT CAMP MØRE 2015

The region's largest recruitment event aimed at young people from secondary schools in Møre and Romsdal took place on 23 September at Campus Ålesund. 2,500 pupils and students received a taster of the opportunities offered by a career in the maritime industries.

LIVE LOCALLY, WORK INTERNATIONALLY

At Ocean Talent Camp, students gain a good insight into training and career opportunities in the offshore industry. Around 30 businesses and organisations were exhibitors at this year's camp.

«We have had a great day, with many committed young people – both those who already

knew what we do, and those to whom we were completely new. We have now provided an insight into what we do, and demonstrated that there are many career opportunities within our industry», says Robin Halsebakk of Sølvtans.

TEACHERS' LOUNGE

New this year was the Teachers' Lounge, where teachers can take a breather, meet colleagues and get information about the offshore industries. Two mini-seminars were held during the day, the topic of which was the market situation in the offshore industries. The teachers also had the opportunity to visit the Rolls-Royce Marine Training and Technology Centre.

COLLABORATION

10 secondary schools took part in this year's Ocean Talent Camp in Møre. The camp offers pupils an education 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 will also help you identify your own interests. Ocean Talent Camp Møre is a collaboration between Ålesund University College, Fagskolen i Ålesund, GCE Blue Maritime Cluster, Mafoss and Maritimt Forum Nordvest.



RECORD NUMBER OF APPLICATIONS TO ÅLESUND UNIVERSITY COLLEGE

Ålesund University College beats all previous records with this year's number of applications. With an increase of almost 15%, Ålesund is one of the best colleges in the country. The increase is approximately double the national average. There is a big increase in many of the engineering courses, such as automation technology and product and system design. Nautical science is the most popular course with 7,6 applications for each place. From 2016, Ålesund University College will merge with NTNU.

OCEAN INDUSTRY TALENTS

Industry Talents, GCE Blue Maritime Cluster has, along with other participants in the maritime industries, joined forces to carry out systematic, binding and long-term recruitment work. The aim is to provide young people in Møre and Romsdal relevant knowledge regarding training and vocational opportunities

in the maritime industries. Another aim is to contribute to increased recruitment for the maritime professions. Throughout 2015, we have focused on promoting collaboration between colleges and the business world. Ulstein Secondary School became an Ocean Industry School in 2015, and will in future forge even

closer links with local industrial businesses. Haram og Spjelkavik VGS had previously been approved as an Ocean Industry School. Focusing on young entrepreneurship, lecturer gatherings and recruitment events are examples of measures anchored in Ocean Industry Talents.

THE «FUTURE LIES IN THE OCEAN» CAMPAIGN

ÅKP has been a collaboration partner of Momentum for many years and they are working together on many campaigns that increase the attractiveness of the region. This year we profiled the opportunities offered by the sea at the Jugendfest in Ålesund on 22 and 23 August. We made three films about the sea that were shown to 20,000 spectators at the stadium and the films had over ten thousand different viewings on social media. We also ensured that people got home safely in «We link Møre with buses».

«YOUR MARITIME FUTURE»

TECHNOLOGY AND ENGINEERING COURSE

GCE Blue Maritime Cluster and several principal businesses in the cluster organised a motivational course for the engineering profession. In 2015, the course was held in February. The organisers of the course were VARD, the Ulstein Group, Kleven and Rolls Royce Marine, along with the organisations Mafoss and GCE Blue Maritime. The course is normally held twice a year, with 16 students per class. Participating schools are Fagerlia, Volda, Spjelkavik, Haram and Ulstein.

The course provides a good introduction into the opportunities offered by the engi-

neering 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.

This year also involved an outing to Trondheim and visits to NTNU and Marintek. 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.





NEW WEBSITES

GCE Blue Maritime Cluster's home page is its most important channel of communication, so it was upgraded in the autumn of 2015 to function as a viable modern website. The new communication platform shall help the cluster project communicate with the most important target groups.



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.



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

WORKSHOPS IN STRATEGIC POSITIONING AND BRANDING

GCE Blue Maritime Cluster conducted three workshops in 2015 that focused on strategic positioning and branding for maritime companies. The workshops were based on the specific marketing challenges faced by each company. The goal was for participants to strengthen their own marketing work and see how the ocean can provide opportunities for marketing and branding at their own companies. The workshop inspired the participants and emphasised best practice in some of Norway's most important companies in the field. The companies receive specific input on their own plans where customers are concerned and about marketing materials directed at the press and within their own 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](#)

[Facebook](#)

[LinkedIn](#)

www.bluemaritimecluster.no





ECOWINDS

ÅKP and Aalesund University College have been participating in an EU project known as ECOWindS for the past three years. The partners in the project belong to the offshore wind clusters in the United Kingdom, Germany, Denmark and the maritime cluster in Møre. The EU allocated approximately EUR 1.9 million to this project.

One of the objectives of the project has been to increase innovation capacity and develop regional strategies for offshore wind services based on a common plan of action and international cooperation strategy for these regions.

An innovation catalogue has also been developed that contains 32 innovation con-

cepts and a joint action plan with strategies for cost reductions and further development of the industry.

The closing conference for this was conducted in Lowestoft, United Kingdom in September. More than 100 participants attended to listen to speeches by DNV-GL, Vestas, Siemens and others on topics such as cost reduction and innovation. Ulstein Design & Solutions, Recogni, Offshore Simulator Center and the Ålesund University College also participated in the conference, which lasted two days.

A number of important stakeholders from the cluster participated during the project period, delivering vessels, designs, deck

equipment and services to European wind parks and operators. There seems to be great interest in further commitment among several of these stakeholders, which is a designated objective of the offshore wind strategy. The ECOWindS Consortium is renegotiating the project as we speak based on the strategies that have been developed for the project. This includes plans to develop testing facilities within virtual prototyping that have been adapted to the offshore wind industry and maritime renewable energy in general.

Read more about the EcoWinds project here: www.ecowinds.eu





RONOMAR II

This project is being funded by Norway Grants and the Green Industry Innovation Programme Romania. The Green Industry Innovation Programme Romania has allocated EUR 26.6 billion to 53 projects and shall contribute to the reduction of economic and social disparities in the European Economic Area (EEA) and strengthened bilateral relations between Norway and Romania. The programme's objective is to increase the competitiveness of green enterprises,

including making existing industries greener, and stimulate green innovation and green entrepreneurship.

ÅKP is a partner of the BUILDING ECO-INNOVATIVE TOWAGE CAPACITY project. The project aims to build a «green» tugboat. ÅKP's role in this is to be the liaison between environments in Romania and suppliers, authorities and the knowledge environment in Norway.



BLUE OCEAN INNOVATION ARENA

The innovation platform of the future

Ålesund University College (NTNU), the Offshore Simulator Centre, ÅKP and Siva have come together to implement the innovation arena of the future in Ålesund. Blue Ocean Innovation Arena is a joint innovation infrastructure for companies that wish

to commercialise the oceans. Here, companies and research organisations can work together to develop the next generation's technological solutions. The aim is to stimulate innovation and make the production process more effective.



BACKGROUND:

The maritime cluster in Møre is of global importance within the fields of design, production and operation of advanced vessels for the international offshore energy sector. Since the 1970s, the technology has been developed in close collaboration with the participants on the Norwegian continental shelf. The cluster has been characterised by its high innovation speed, high level of experience-based skills and aggressive shipowners. The vessels are becoming ever more advanced and today the market for them spans the whole world.

As the vessels become more complex and the markets grow, primarily internationally, the cluster faces challenges on several fronts. New technology is being developed in

other industries and must be implemented in the vessels. At the same time, the experience-based innovation platform is challenged by global value chains where knowledge does not naturally flow back to the cluster core as it once did. The North Sea has become less important and Statoil is also applying the brakes and introducing measures designed to reduce costs. For the cluster to grow in this region, it is therefore dependent on high innovation speed and a reduction in costs. Contributing to a revived innovation platform to face the new challenges is an important part of GCE Blue Maritime's task.

OUR IDEA IS:

To create the future's open innovation arena for all industries.

MAIN GOAL:

To create a unique innovation arena which, by using new technological knowledge and infrastructure, will create rapid and cost-effective innovations for offshore industries

The arena includes three enabling areas of technology:

- virtual prototyping
- big data
- 3D CAVE/3D wall

It will be possible to use these technologies to stimulate innovation prior to:

- design review
- operational optimisation
- high speed incubation



AREAS OF APPLICATION FOR THE BLUE OCEAN INNOVATION ARENA:

VISUAL VERIFICATION:

Virtual prototyping enables companies to test new concepts, engineering and production solutions by exploring the solutions virtually before they are constructed. The arena can also be used for testing new production lines and for preparing for automation. This is especially important in a process of industrialisation.

VERIFICATION OF CHARACTERISTICS («VIRTUAL TRIALLING»)

Ship design is to a large extent about configuration. Thrusters, machinery, cranes, winches, the hull, etc. all come together to form new solutions for vessels. Work is carried out to develop a common standard for the simulation of maritime systems that enable a behavioural model of the new ship to be created as it is being designed. The purpose is to further develop prototyping as a mechanism for innovation. Technology of this nature makes it possible to take a virtual tour before the ship is constructed. Performance and consumption can be tested. The technology can be used from the sales phase until engineering takes place.

VISUALISATION OF BIG DATA

The ship has a full complement of sensors with respect to machinery and the environ-

ment. These areas can be monitored continuously and if they are linked to other sources of unstructured data, this forms the basis for state-based maintenance, input for new designs, and new market models. We also believe that it will be possible to instrumentalise the entire offshore area where data can be used to monitor different biological stocks and the environment.

HIGH SPEED INCUBATION

The start-up of a new business often begins with one form or another of hypothesis connected to a new possibility. It is crucial to have such hypotheses tested as quickly as possible. We are convinced that such an arena can be used to visualise ideas and involve customers and networks. Speed is crucial for effective incubation and the arena can become a central tool for accelerating the processes.

TRAINING

The arena is a centre for training in 3D and associated technology for Ålesund University College/NTNU. Virtual prototyping requires three fundamental disciplines.

3D modelling

Investment in the latest for 3D modelling tools that afford engineering students first-class training.

System simulation

A framework for the simulation of maritime systems. The aim is to develop generic models which the industry can adapt to its products.

Visualisation

Advanced visualisation and simulation environments exist today in connection with the planned arena. We are now seeing a rapid development of virtual reality (VR) and «augmented» technology. In this field, importance will be attached to tools for the development of new applications.

Demonstrations

The arena can be used as a centre of knowledge for offshore activities. Visitors can study ships, installations on the seabed, ocean currents, shoals, etc. The arena will be a showcase for the offshore industries where the companies can exhibit their products and services.

The arena is an instrument for increased innovation speed, but also for accelerated incubation, research and a showcase for the maritime and marine cluster.



Vessel	
CD Dive No	: 421
Class No	: 206
Depth	: 200
Speed	: 1.5
Direction	: 180
Position	: 1000 1000
Altitude	: 1000
Pressure	: 1000
Temperature	: 1000
Humidity	: 1000
Light	: 1000
Wind	: 1000
Wave	: 1000
Current	: 1000
Magnetic	: 1000
Compass	: 1000
GPS	: 1000
IMU	: 1000
USBL	: 1000
SWATH	: 1000
Chirp	: 1000
Simrad	: 1000
Raytheon	: 1000
Teledyne	: 1000
Acoustic	: 1000
Hydro	: 1000
Seismic	: 1000
Geophysical	: 1000
Geological	: 1000
Geotechnical	: 1000
Environmental	: 1000
Biological	: 1000
Chemical	: 1000
Physical	: 1000
Mathematical	: 1000
Statistical	: 1000
Computational	: 1000
Simulation	: 1000
Modeling	: 1000
Analysis	: 1000
Visualization	: 1000
Reporting	: 1000
Logging	: 1000
Archiving	: 1000
Backup	: 1000
Recovery	: 1000
Migration	: 1000
Integration	: 1000
Interoperability	: 1000
Scalability	: 1000
Flexibility	: 1000
Modularity	: 1000
Extensibility	: 1000
Customization	: 1000
Configuration	: 1000
Deployment	: 1000
Operation	: 1000
Maintenance	: 1000
Support	: 1000
Training	: 1000
Documentation	: 1000
Compliance	: 1000
Security	: 1000
Privacy	: 1000
Accessibility	: 1000
Usability	: 1000
Reliability	: 1000
Availability	: 1000
Performance	: 1000
Efficiency	: 1000
Effectiveness	: 1000
Productivity	: 1000
Quality	: 1000
Consistency	: 1000
Accuracy	: 1000
Precision	: 1000
Detail	: 1000
Clarity	: 1000
Transparency	: 1000
Accountability	: 1000
Responsibility	: 1000
Integrity	: 1000
Honesty	: 1000
Trustworthiness	: 1000
Credibility	: 1000
Reputation	: 1000
Brand	: 1000
Image	: 1000
Identity	: 1000
Presence	: 1000
Visibility	: 1000
Awareness	: 1000
Engagement	: 1000
Interaction	: 1000
Communication	: 1000
Collaboration	: 1000
Teamwork	: 1000
Cooperation	: 1000
Partnership	: 1000
Relationship	: 1000
Network	: 1000
Community	: 1000
Organization	: 1000
Institution	: 1000
Structure	: 1000
System	: 1000
Process	: 1000
Methodology	: 1000
Framework	: 1000
Model	: 1000
Paradigm	: 1000
Approach	: 1000
Strategy	: 1000
Tactic	: 1000
Technique	: 1000
Method	: 1000
Procedure	: 1000
Protocol	: 1000
Standard	: 1000
Convention	: 1000
Custom	: 1000
Practice	: 1000
Tradition	: 1000
Customization	: 1000
Personalization	: 1000
Individualization	: 1000
Segmentation	: 1000
Targeting	: 1000
Positioning	: 1000
Marketing	: 1000
Sales	: 1000
Promotion	: 1000
Advertising	: 1000
Publicity	: 1000
Media	: 1000
Journalism	: 1000
News	: 1000
Information	: 1000
Knowledge	: 1000
Wisdom	: 1000
Understanding	: 1000
Insight	: 1000
Discovery	: 1000
Innovation	: 1000
Research	: 1000
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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 **20** SHIPPING COMPANIES

14 SHIPYARDS **169** SHIP EQUIPMENT SUPPLIERS

22 500 SKILLED EMPLOYEES

55 BILLION NOK IN TURNOVER (2014)



**BLUE
MARITIME
CLUSTER**

GLOBAL CENTRE OF EXPERTISE
NORWAY