

# Kompetanseoverføring mellom havnæringer – Nye muligheter

Overfalte 2016 Jon O. Hellevang, Senior Subsea Innovator, GCE Subsea

WORLD-CLASS SUBSEA SOLUTIONS



#### **New possibilities**

- // Marine food production: 35 per cent increase in aquaculture from 2013-2022.
- **Deep-sea mining:** 10 per cent of minerals will come from the seabed in 2030.
- **// Offshore renewable energy:** The EU has targeted a 20 per cent reduction in greenhouse gas emissions and 20 per cent increase in use of renewable energy by 2020.









#### We have the possibility





#### Regionen som har alt

Innsikt: Det holder ikke bare å løfte frem allerede sterke bransjer for å få til nyskaping. Samarbeid på tvers av bransjene må til. Bergensregionen har det som skal til - hvis vi vil.

Stig-Erik Jakobsen , Jarle Aarstad Høgskolen i Bergen

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#### Sats der vi kan bli best

Bergensregionen har et unikt utgangspunkt for å ta en globalt ledende posisjon, basert på å se subsea, sjømat og maritim sektor i sammenheng.

Geir Anton Johansen Dekan, Høgskolen i Bergen Owe Hagesæther CEO, GCE Subsea

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## **The Cluster Map**

#### PARTNERS EMERSON 🕌 OneSubsea Industry **FMC** Technologies HELLENES **Aker**Solutions >> GASSCO DNV-GL CMC **SINTEF** SNF A HAVFORSKNINGSINSTITUTTET uni Research Polytec R&D un Research **Higher Education** (1) BI HØGSKOLEN I BERGEN Institutions Development BERGEN Flora kommune Y SOGN OG FJORDANE -HORDALAND FYLKESKOMMUNE Contributors MEMBERS ARGUS Business APIteq BEEREN **BS**A ADVAN7[EC BERGEN MARITIME VGS OG FAGSKOLE CLAMPON RASMUSSEN & BROCH **Region Bergen** VISION BERG Asubsen ARGUS REMOTE SYSTEMS AS Þ **DCF**subsea ENREC **HENSCHIEN** Insurance V **Deloitte.** DNB 3 GOONTECH HEAD S EXPRO BSEA Huisman acodtech idévekst INOVATUM INVENTAS MARITIM SERVICE a.s knowit KIN MEKATRONIKK METAS MJØS NIVA JAKTA METALL AS logiteam KLUGE LieOverflate Norwegian olvende CONS In the services pwc profanalysis **CMC** Prototech RadøyGruppen NORNE Norwegian Subsea PROSESSMETALL AS Ocean Team Scandinavia as nui оспо Offshore Sensing AS safeclean DEEP VISION sımsea SpareBank SIEMENS SubC Solutions SOLID SparebankenVest SEA-HAWK SERPROOF SOLUTIONS SOCON VALVES WERGELAND SubseaPartner TESS THOMMESSEN Tracerco Transmark Subsea 🏅 WESTCON' RXelectronic UNITECH WATER () LINKED TRO TRELLEBORG TTS Wi Sub Esterbe Maskin WindTec WIKBORGREIN Supported by Innovasjon Norge **Siva** 🐼 Forskningsrådet MARITIME CLUSTER Cluster Relations NODE NCE Instrumentation NCE Raufoss NCE NCE Maritime CleanTech NCE Seafood TORENING PORENING ARCTIC A HOG Yaro UTC UTF IN **INTSOK** SUT VNR National Relations Bunnsolid FFU Gode sirklar COMARITIMT/OID1 CONNECT ACIM Entering an Extension OE International Relations FIESP HUNICIPALITY SANTO -IOTR



GCE Subsea strengthens innovation and internationalisation of the Norwegian subsea cluster



1.1

5 / 14.11.2016 ///////

Picture: FMC Technologies

# **GCE Programme**

- **Goal:** Make the cluster more dynamic and attractive, and boost individual companies' innovation and competitiveness.
- II Part of the Norwegian Innovation Clusters programme, launched to trigger and enhance collaborative development in central Norwegian business clusters.

#### **GCE Subsea**

- // NOK 10 million in annual funding
- // Annual budget at NOK 25 million
- *II* 6 man-years in the organisation







### **GCE Subsea**

#### // Main goal:

Increase the cluster's competitiveness and global market share, and take a leading position in sustainable utilisation of ocean resources.

- // Main objectives:
  - Cost-efficiency: strengthen competitiveness
  - Research-based innovation: paradigm-shifting technology
  - Ocean Innovation: beyond oil and gas
- // Key global drivers:
  - increased demand for energy and marine resources
  - climate and environmental challenges
  - stronger global competition





### **Results**

#### **Competence:**

- *II* 3 BEng and 2 MEng programmes
- // Subsea Awareness Course
- *II* Global Subsea University Alliance

#### Technology:

- *II* Supported over 60 pre-projects
- // LoVe Ocean Observatory
- II 2 OTC Spotlight on New Technology awards

#### **Business Development:**

- // Subsea First/Next Step
- // Subsea Entrepreneur

#### Market:

- *II* International stands and study tours
- *II* Brazil Entry programme
- // Broad international collaboration

#### www.gcesubsea.no/page/6700/Success\_Stories









![](_page_7_Picture_21.jpeg)

# From NCE to GCE Subsea

- II New focus areas:
  - Ocean Innovation: Subsea solutions and knowledge beyond oil and gas
  - Work Processes: Strong focus on global competitiveness

- *II* Increased focus on:
  - R&D test facilities and infrastructure
  - International education, mobility and R&D programmes
  - Supporting members in international markets

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![](_page_8_Picture_10.jpeg)

# **Key Strategic Areas**

- I. Competence and Infrastructure
- II. Ocean Innovation
- III. Technology
- IV. Entrepreneurship and Business Development
- V. Market
- VI. Work Processes

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### **GCE Subsea Members Feedback – Main Fokus**

![](_page_10_Figure_1.jpeg)

![](_page_10_Picture_2.jpeg)

11 / 14.11.2016 ///////

#### **GCE Subsea Members Feedback – New Market Focus**

![](_page_11_Figure_1.jpeg)

![](_page_11_Picture_2.jpeg)

12 / 14.11.2016 ///////

# Subsea Competence – In new market

#### SYSLA GRØNN

# 🖬 Nå snur subsea-bedriftene seg mot fornybar energi

Mange bedrifter snuser nå på andre markeder enn olje og gass.

FORNYBAR ENERGI 05.04.2016 | AV CAMILLA AADLAND

I en undersøkelse som GCE Subsea har gjennomført blant sine medlemmer har 34 av 56 svart at de har vurdert eller har gått inn i offshore fornybar energi.

4Subsea, som holder til i Asker og Bergen, er en av disse.

![](_page_12_Picture_7.jpeg)

- I 2010 bestemte vi oss for utvikle ingeniør- og analysetjenester mot offshore vind, særlig mot flytende vindmøller. Vi så dette som en spennende utfordring vi kunne klare å løse, særlig fordi mange av verktøyene og mye av metodikken vi bruker innen olje og gass kunne brukes på flytende vindmøller, sier Viko, som er avdelingsleder i 4Subsea.

MEDIADI ANE

Nils Gunnar Vik

4Subsea

![](_page_12_Picture_10.jpeg)

Teknologioverføring fra olje og gassektoren vil gi gevinster Av Tom Back

![](_page_12_Picture_12.jpeg)

# De snur seg fra olje og gass mot havbruk

- Det er viktig å ta miljøpåvirkninger alvorlig hvis oppdrettsnæringen skal vokse, sier adm. direktør Thorleif L.L. Gustavsen i Aanderaa.

![](_page_12_Picture_15.jpeg)

# **Subsea Competence – In new market**

SPLD LOGGINN MENY

# Kjell Inge Røkkes Aker satser en halv milliard på offshoreoppdrett

Aker og oppdrettselskapet Royal Norway Salmon slår seg sammen for å satse til sammen 900 millioner kroner på et nytt fiskeeventyr.

![](_page_13_Picture_4.jpeg)

VIL TIL HAVS: Slik ser Aker og Norway Royal Salmon for seg at de nye offshore oppdrettsanleggene vil se ut.

ILLUSTRASJON: NRS/AKER

# Hauge Aqua har landa avtale på oppdrettsegget

Publicent: 11.FEB 2016 14:30 Oppdatent: 12.02 2016 15:20

![](_page_13_Picture_9.jpeg)

Signerer kontrakt med Marine Harvest for utvikling av «Egget».

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E24

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# **Project Example** GCE Subsea

# **Innovation Example – Seaproof Solutions and Partners**

#### **Crossover Oil and Gas to Offshore Wind**

- *II* Subsea Next Step programme in 2012
- // Pre-project funding
- // Results:
  - 90 million Norwegian kroner in revenue within offshore wind in 2015. This is about twice the company's total revenue in 2012.

 Participation in the Subsea Next Step programme was very useful to expand our business of bend-stiffener products towards the offshore wind market.
 Henrik Bang-Andreasen, CEO Seaproof Solutions

![](_page_15_Picture_7.jpeg)

Offshore wind cable installation

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![](_page_15_Picture_10.jpeg)

### **Competence and Infrastructure**

- Increased focus on joint test facilities and R&D infrastructure
- // Science City Bergen
- II Global Subsea University Alliance: international education programme and RDI projects <u>www.subsea-alliance.org</u>

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# **Norwegian Ocean Laboratory**

- *II* Open in 2016
- // Initiated by UiB, IMR and FFI
- Hosts several important national R&D infrastructures including
  National Marine Robotics Facility and Norwegian Atlantic Current
  Observatory:
  - Work ROV (6 000meter)
  - AUVs and gliders
  - Operation of Lofoten-Vesterålen Cable Observatory (LoVe)
- *II* An arena to develop next generation ocean observing technology
- *II* Obtain new knowledge supporting science and industry
- *II* Six research vessels operated by the Institute of Marine Research

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![](_page_17_Picture_11.jpeg)

![](_page_17_Picture_12.jpeg)

### **Marine Mineral Resources**

- // UiB has pioneered deep-sea research in Norway
- *II* Mapping of Mid-Atlantic Ridge since the mid-1990s
- *II* Awarded status as Norwegian Centre of Excellence (SFF) in 2007
- *II* Performed extensive mapped mineral resource in Norwegian water
- II New Centre for Deep-sea Research supported by K.G Jebsen fund will secure an increase in research capability
- II GCE Subsea will collaborate with the centre to better quantify the amount of marine mineral resources available and develop integrated monitoring technology and methodology

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![](_page_18_Picture_9.jpeg)

### **Ocean Matrix**

- Demonstrate that SME innovation capability can be repurposed across ocean based value chains
- // Help SMEs move into growing emerging ocean based industries
- **//** Pilot cases:
  - Cost efficient offshore wind
  - Offshore aquaculture
  - Seabed mining
- Collaboration between Norway, Denmark, Belgium and UK

![](_page_19_Picture_8.jpeg)

![](_page_19_Picture_9.jpeg)

# **Enabling emerging Ocean industries**

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# Subsea meets aquaculture

- // Phase 1 First half 2016
  - Networking between subsea and aquaculture
  - 30 companies visiting hatcheries and fish farms, presentations & workshops
  - Several ongoing projects
- *II* Phase 2 Second half 2016 and 2017
  - Continue the work from phase 1
  - Visit relevant companies and customers to connect ideas
  - Business development programme ACCEL Crossover (from subsea to aquaculture)
  - Workshops with both industries; Capacity building, idea generation and identification
  - Establish and realize more projects

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![](_page_20_Picture_12.jpeg)

![](_page_20_Picture_13.jpeg)

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# **EU advisor – Blue Growth**

- II Joint resource between GCE Subsea and NCE Seafood
- *II* 2 years partial funding from Innovation Norway
- *II* Option for 2 years extension
- II Advisor will work closely with the cluster companies:
  - Identifying relevant EU calls
  - Producing top quality applications
  - Influence EU programmes and calls
- II Located at Marineholmen

#### STRENGHTENS EU FUNDING CAPACITY

Innovation Norway has granted NCE Seafood Innovation Cluster and GCE Subsea partial funding of a new joint EU advisor position.

Published: 1 July 2016

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## **Entrepreneurship and Business Development**

- *II* Link entrepreneurs to funding, industry and R&D groups.
- *II* Increase focus on service innovation.

#### **Business development programmes:**

- **Subsea First Step** supports start-ups and early phase companies.
- **Subsea Next Step** helps you develop new product and services.

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# **MIT Regional Entrepreneurship Acceleration Program**

### Innovative Capacity & Entrepreneurial Capacity Are Distinct Regional Assets

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I-Capacity Ability to develop new to the world innovations from inception through to the market. **E-Capacity** Ability to start and build new to the world businesses from inception to maturity.

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**Strong I-Cap:** Universities, Central R&D, Network of researchers, Medical Centers

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![](_page_23_Picture_8.jpeg)

Strong E-Cap: Entrepreneurs, Mentors, Founding Teams Investors at all stages

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![](_page_23_Picture_11.jpeg)

#### 12 **III**

## **Cost reduction and Competetiveness**

- // Reduce costs and increase productivity
- // Home-source production to Norway
- *II* Robotics and digitisation
- *II* Collaboration between the three Norwegian GCE-clusters
- *II* Collaboration with M.A.I Carbon Cluster (Germany)

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### **Standardisation**

- // Subsea Documentation Standard
- // GCE Subsea engaged and provided input on behalf of SMEs
- *II* DNVGL-RP-0101: TechnicalDocumentation for Subsea Project
- II Johan Sverdrup contract based on this RP
- II GCE Subsea will join JIP on SubseaProcessing Pumps

![](_page_25_Figure_6.jpeg)

![](_page_25_Picture_7.jpeg)

# **Ongoing technology pre-projects**

- *II* Condition monitoring and automation:
  - Automation of image processing
  - Automating subsea video analysis and annotation
  - Corrosion Erosion Monitoring
  - Baseline noise and condition monitoring

- II New markets:
  - CO<sub>2</sub> storage monitoring
  - Subsea geothermal energy production
  - Ocean Thermal Energy Conversion
  - Tidal water power with hydrogen storage
  - Mapping of marine mineral resources

- *II* Flow and multiphase:
  - Multiphase flow imaging by gamma-ray tomography
  - Fluid characterisation improving multiphase flow meters
  - ROV installable non-intrusive subsea water flowmeter
- *II* Enhance Recovery Technology (Subsea pump)
- *II* Simulation of marine operations

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### WORLD-CLASS SUBSEA SOLUTIONS

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