



# Submarine Capability beyond 2025

## Sea Power Seminar 2012

Special Session on Conventional Submarines

**FOR  
SJØFORSVARETS TARV  
OG UTVIKLING**



Stiftet 1835

**HVOR  
GENERASJONER  
MØTES**

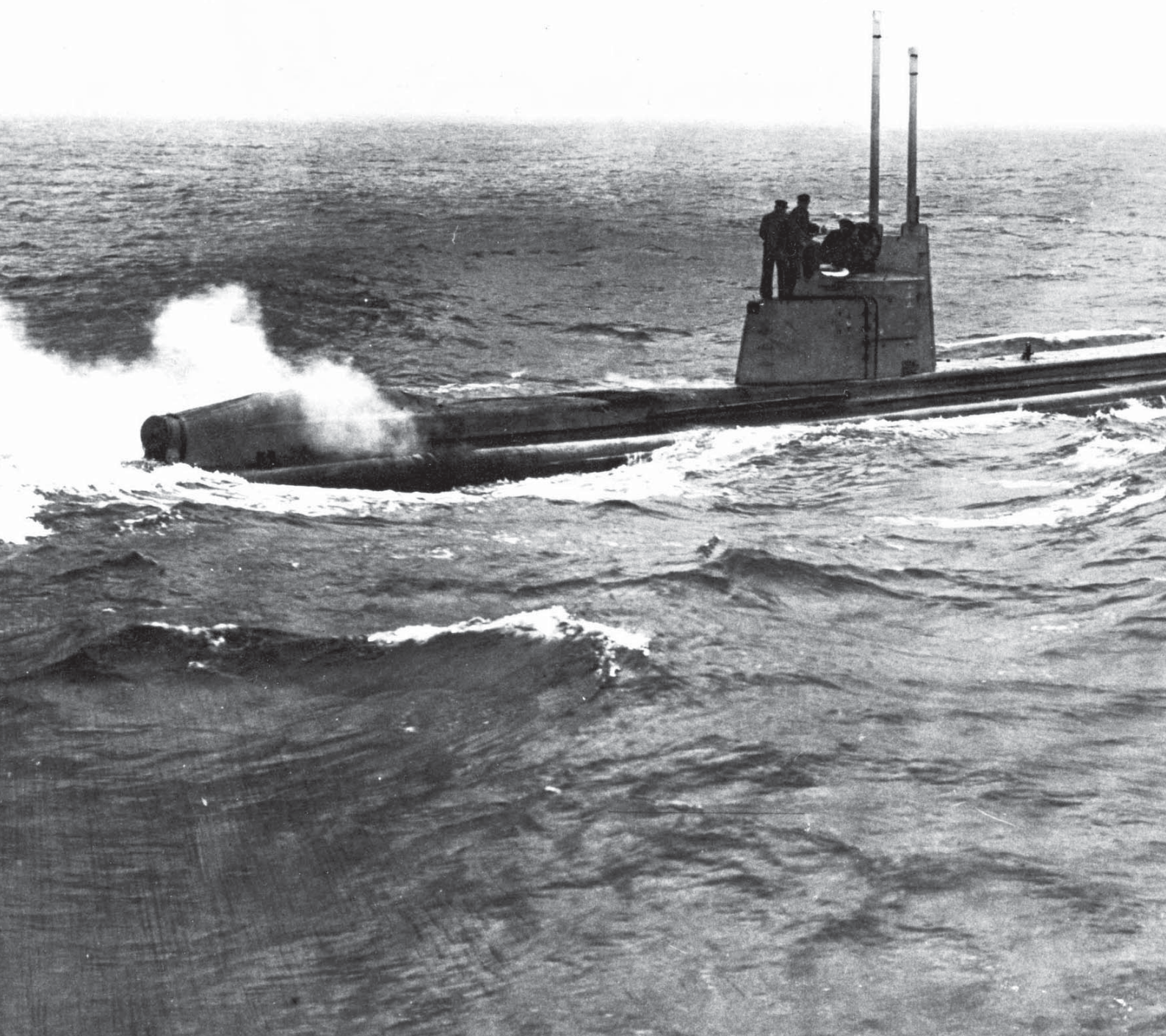


**Chairpersons of the Submarine Conference:**

- Captain (R) Hans-Christian Kjelstrup
  - Technical specialist ULA-Class
- Lieutenant Helene Folkestad
  - Ops officer ULA-Class

SUBMARINE KOBLEN AT SEA FROM 1909

Layout/design: [www.zign.no](http://www.zign.no)





# Good morning to everyone

## – Welcome to the Submarine Conference



The Navy League, Sjømilitære Samfund, has invited you to contribute with your best information on Underwater Capabilities beyond 2025. I am proud to meet a forum so dedicated and competent for this important topic.

Norway has operated submarines since 1909 – hence 100 years of operations was celebrated during the year 2009.

ULA – class subs will achieve the constructed life time in 2020-2025. A nation which to the extreme is dependent on activities at sea, one hardly can believe not acquiring a new generation of the navy's most Strategic Weapon System.

A recommendation by the Norwegian government, by November 2010, concluded that Norway has the need for Submarine Capabilities. However, submarine alternatives should be further explored in order to maintain national submarine capability beyond 2020.

To look backwards, design development of ULA- class was contracted in 1973. Contract for detailed engineering and construction signed in 1982. Delivery of First of Class took place in 1989. Taking into

account this period of more than 15 years, the time is now due to get a political statement necessary to formally establish a Submarine Project.

The aim and purpose to day is to learn more about the challenges, the options and the crucial choices which have to be made during the period of preparations and the extensive engineering necessary to create a balanced concept for the new generation of submarines.

I do wish you all a long day of learning, discussions and achievement of new relations.

The Technical and Social get – together to night should be perfect to expand relations.

Vice President  
Captain Svein Erik Kvalvaag



Commanding Officer,  
Commander SG Torfinn Sørensen

## ETA 29. August 1700 hrs



**ETA 30. August  
1200 hrs**



C.O. KNM Skudd,  
Lieutenant Commander Bøe



## **NaCoM Energy**

**Process & Engineering Services**



NaCoM Energy is established at Ågotnes, Sotra and offering engineering support and design of mechanical and process solutions for the oil & gas industry. Our main goal is offering its customers better services, better project management and state of the art solutions. NaCoM Energy solutions and products can be found on a number of offshore and onshore installations. Our technical staffs consists of multi-disciplinary engineers with experience, ranging from 15 to 40 years, of designing, calculating / simulating and project administration of custom-made process systems. NaCoM Energy find optimized solutions to fulfil particular needs either through designing and manufacturing in-house or through cooperation with our suppliers. In addition NaCoM Energy is the Norwegian representative to Danfoss Sea Recovery (Water Maker System), reverse osmosis technology.



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### OUR BUSINESS CONCEPT

Saab constantly develops, adopts and improves new technology to meet changing customer needs. Saab serves the global market of governments, authorities and corporations with products, services and solutions for military defence, commercial aviation and civil security.

### OUR VALUES

**Expertise** – We combine a strong history of knowledge with constant learning.

**Trust** – We are global citizens, honest and reliable and we keep our promises.

**Drive** – We have a passion for innovation, we are open to change and we are committed to being fast and flexible.



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# 75

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## Babcock International Group PLC

Babcock is the UK's leading engineering support services company delivering critical support to customers who own or manage complex and strategically important infrastructure or assets. It is equipment and platform agnostic which enables it to focus solely on cost effective support solutions.

Babcock delivers significant operational improvements at reduced cost through strategic and collaborative agreements with the MoD and other major defence contractors; working towards common objectives.

Babcock's Marine & Technology Division undertakes 100% of submarine sustainment and 75% of surface ship sustainment in the UK and manages submarine sustainment in Canada. Babcock Marine & Technology also provides independent strategic military communications services and systems across the full RF spectrum.

### Through-Life Platform Support

Supporting all stages of the lifecycle:

In-Service Support	Life Extension	Design for Support
Engineering Support and Information Knowledge Management that optimises maintenance <ul style="list-style-type: none"><li>▪ Integrated approach with the MOD</li><li>▪ Management of business processes</li><li>▪ Maintenance of design intent and safety case</li><li>▪ Collaborative Working Environments</li></ul>	De-risking submarine programmes through platform life extension programmes <ul style="list-style-type: none"><li>▪ Analysis of options for life extension</li><li>▪ Programme management</li><li>▪ Safety justifications</li><li>▪ Risk management</li></ul>	Reducing the total cost of ownership for future platforms <ul style="list-style-type: none"><li>▪ Ensures whole life perspective</li><li>▪ Maintenance and support solutions</li><li>▪ Staff embedded within design teams</li></ul>

### Defence Communications

Providing global reach to military customers through radio frequency communications:

- Delivering efficient managed services for strategic VLF, LF and HF to the MoD and NATO
- Supplying the UK's HF service and saving the MOD £1.2m per year by reducing satellite traffic
- Offering a cost effective alternative to the replacement of existing equipment through adopting and upgrading legacy systems







NORWEGIAN DEFENCE LOGISTIC ORGANISATION (NDLO)

## MAINTENANCE DIVISION MARITIME BRANCH

**The meeting with NDLO MAINTENANCE MARITIME is a meeting with workshops, professionals environment, expertise and infrastructure exclusively targeting the Navy's needs!**

Our main activities are planning for and executing of regular preventive maintenance, modifications and repairs, as well as technical assistance and support through dialogue, participation and cooperation! Subjects range from advanced weapons and control systems to traditional technical areas on the vessels. Main goals for our activities are all the time the Norwegian Navy vessels and ships and their equipment.

Maritime is located in different places in Norway; Surface Section at Haakonvern, Submarine Section at Laksevåg. Mechanical workshop in Horten and the North section in Ramsund. For the business as a whole, the practice is to support where the need for our services occurs; is it on land or on sea along the Norwegian coast or abroad when the vessels are on missions away from Norway.

Maritime has currently 25 apprentices and is an approved training company in the following branches:  
Industrial mechanic, precision mechanic, motor mechanic,

machining, CNC-machining, sheet metal worker, welder, industrial plumber, electrician, computer electronics technician, automatician and business and management profession.

Particularly relevant for the time being are the projects P6344 and P6345 where the Submarine Section already is working with these large upgrade projects on the Navy's ULA class submarines.

The Surface Section at Haakonvern has specialized in maintenance of the Navy's surface combat vessels.

The section in Horten has in depth a number of larger and smaller projects like; production of stack frames for ATV and snowmobiles (P4033), transportation boxes for transmission Leopard 2 (P5060), storage device for ammunition for SISU (P5350), roof frames for top protection of Scania (P5819), Goldfish containers (MJK) and weapons integration for these (P5819).

The sections in North and in Horten are also involved in the disposal of the 75 and 125 mm coastal fortifications.

The North Section, which is supporting our Navy vessels in their area, will also get a little involved in the project P6007, new navigation on the Combat boat 90.

**We are present on Sea power seminar No. 13 in 2012 in Ulvik with representatives from the sections in Bergen, Horten and Ramsund.**

**Welcome to our stand No. 30!**



### Wednesday 29th August 2012

- 0930 Opening statement**  
*Vice President of Sjømilitære Samfund*  
*Captain Svein Erik Kvalvaag*
- 0940 Strategic setting – National challenges beyond 2020**  
*Director IFS Professor Rolf Tamnes*
- 1000 An overview of nations operating submarines**  
*Chief of Branch Elling Tveit, FFI*
- 1020 Coffee brake – Visit of exhibition**
- 1050 National experience from operating submarines**  
*Commander Nor Submarine Service*
- 1120 Political statement on future submarine capabilities**  
*Member of Parliament Svein-Roald Hansen, Arbeiderpartiet - Stortinget*
- 1140 Political Statement on future submarine capabilities**  
*Member of Parliament Lars Myraune, Høyre – Stortinget*
- 1200 Lunch hour**
- 1315 Presentation on submarine capabilities beyond 2025.**  
An overview on recommended qualities likely to be incorporated.  
Driving Factors and their influence on size and price of the complete submarine, - engineering included.  
*Rear Adm Patrick Leroux, Naval Adviser Submarine Division, DCNS, France*
- Coffee – Visit of exhibition**
- 1430 Main qualities and capabilities to be presented from the industry represented in the exhibition – 15 minutes each participating exhibitor.**
- 1730 Closing of the conference**  
*Vice President of Sjømilitære Samfund*
- 1900 Social get-together**



**Exhibition Submarine Conference**  
– Program for presentations  
Max 15 minutes - Each exhibition:

- NAVANTIA
- NAMMO
- THALES UWS
- THALES COMS
- THYSSENKRUPP MARINE SYSTEM AG
- ELECTRONICON / ADAPTIVE METHODS

**PAUSE**

- KOCKUMS AB
- KONGSBERG DEFENCE SYSTEMS
- QINETIQ
- GERMANISCHER LLOYD NORGE AS
- FLO MAR UVB
- BABCOCK MARINE TECHNICAL DIV
- FFI



Stiftet 1835

**Sjømilitære Samfund**  
- Where generations meet



# Presented by:



## Here below the summary of DCNS speech:

"The presentation, composed of two parts, will start with the vision that submariners share about their future operational needs. The second part will show how DCNS can fulfill these needs, knowing that by the time being some solutions are not yet fully available or sea-proven.

For a given size of the submarine, all the features may not be implemented together, that is why it is of paramount importance to open an interactive work based on mutual confidence between the submariners and the designers."

This speech will be given by:

**Patrick Leroux ( Rear-admiral RTD), Naval Adviser , Submarines Division, DCNS.**

## CV

"Before joining DCNS Group as Naval Advisor for the Submarines Division, admiral Patrick Leroux spent nearly thirty years serving in the French Submarine Forces. Specialized in underwater warfare and nuclear energy, he has been commanding officer of one attack submarine and one strategic submarine.

Among other appointments, he has been training officer of both an attack squadron and also the strategic squadron.

He also served as head of the submarines programs office at the navy headquarters and as chief of staff of the submarine force. His last appointment as rear-admiral was deputy commander of the Submarine Forces.

Almost equally on board both attack and strategic boats, Patrick Leroux spent nearly thirty thousand hours deep dived."



**Svein Roald Hansen**, Member of Norwegian Parliament for Labor Party from 2001.

First Deputy Chair of the standing committee of Foreign Affairs and Defence.

Head of Norwegian delegation to the EFTA and EEA Parliamentary Committees.

Former Political Adviser and State Secretary, Office of the Prime Minister.

Mayor of Fredrikstad 1995-1999. 63 years old.



**Mr. Elling Tveit** is presently Director (acting) of the Maritime Systems Division at the Norwegian Defence Research Establishment (FFI). He received his masters degree in Applied Mathematics from the University of Bergen (1986). He has worked at FFI since 1987.



**Dr. Rolf Tamnes** is Director of the Norwegian Institute for Defence Studies, professor at the Norwegian Defence University College, and head of the international research programme Geopolitics in the High North. He has published extensively on defence and security issues.



## Pål Øystein Hope

Borne in Bergen 1966, married, 3 kids.

Military education: BSIS (Army) 1987, Naval Academy 89-91, Qualifying submarine courses, Staff course I, 2001 - Staff course II 2008, Submarine service 91-2001, (CO Kobben and Ula, Squadron commander) Chief of Staff - Submarine services 2009- Norwegian Task group 02-04, and 07-08, (N3 submarines, N7), UKMARFOR 04-07, (Staff officer UWW).



## Stortingsrepresentant Lars Myraune

Lars Myraune er i dag på det tredje året som stortingsrepresentant for Høyre.

Han er født i 1944 Nord-Trøndelag. Han gjennomgikk Luftkrigsskolen i årene 1969 - 1971, Stabsskole og Forsvarets Høyskole.

Tjeneste ute og i Norge. Generalmajor ved oppnådd pensjonsalder.

Han var ordfører i Frosta kommune fra 2003 til 2009 da han ble valgt inn på Stortinget.

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# GL Group



**Germanischer Lloyd** is one of the leading Classification Societies in the world.

The depth of our heritage, together with a unique combination of expertise, focus and understanding, give us the opportunity to build on our position as leaders in our industry.

We retain respect and trust, we provide unrivalled expertise and success through the ambition of our exceptional people.

**Germanischer Lloyd** daily deals with matters concerning **Naval Surface Ships** such as Destroyers, Frigates, Auxillary Vessels, etc. Aproximately 100 **Naval Surface Ships** operates with GL Class. Many more are built to our rules!

**Underwater Technology**, is a field where **Germanischer Lloyd** deals with all kinds of Diving Systems, Military and Civilian Submarines, Submersibles, Underwater Vehicles, Underwater Equipment and Underwater Working machines. This also includes systems providing Hyperbaric and Hypobaric environments, with manned or unmanned operation.

**Military Submarines** and their systems can be classified and certified according to **GL** rules for **"Naval Subsurface Ships"**. As the **first and only** classification society, **Germanischer Lloyd** have classed **Naval Submarines** built to **GL** rules and where the Navy keeps the **GL** Class in operation!



## ThyssenKrupp Marine Systems



ThyssenKrupp

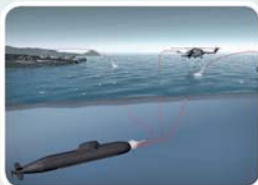
ThyssenKrupp Marine Systems (TKMS) is one of the worldwide leading system providers in high-tech naval shipbuilding.

The naval surface vessels, submarines and maritime defense equipment designed and built by Blohm + Voss Naval, HDW and Kockums, three renowned shipbuilding companies of ThyssenKrupp Marine Systems, are widely acknowledged for their superior technological excellence, reliability and longevity.

The TKMS reference list of cutting edge surface ships includes the Class 123, 124 and 125 frigates for the German Navy, a sizeable fleet of MEKO® class OPVs, corvettes and frigates, VISBY stealth corvettes as well as the highly dependable MCMV 36 and SAM 3 minesweepers.

Beneath the sea, HDW and Kockums map the way for navies operating non-nuclear submarines with the famous Class 209, 212A and 214, as well as with the Gotland and Collins Class boats. They are the only shipyards providing mission proven AIP technology.

Ships. Systems. Solutions. Worldwide.



**NAMMO** is a leading international corporation which develops and manufactures ammunition systems and rocket motors for tactical missiles and space applications. The company has also become a world leader within environmentally friendly demilitarization services.

**NAMMO** has 2000 employees and a turnover of 3.4 billion NOK approx. The main headquarters and a significant part of the operations are situated in Raufoss, Norway. In addition to the activities in Norway, Nammo has subsidiaries in Sweden, Finland, Germany, Switzerland, USA, Canada and Australia.

**NAMMO** has developed and produced advanced tactical rocket motors, primarily for the NATO market, since the beginning of the 60-ties. The current product portfolio includes modern boosters for anti-ship missiles, as well as the rocket motors for the next generation air-to-air and ground-based air defense systems. These rocket motors can be equipped with compact Thrust Vector Control (TVC) units, providing the missile a significantly increased operative capacity by enabling enhanced maneuverability.

**NAMMO** is responsible for the development/manufacturing of the rocket motor for the following missile programs:

- ESSM (Evolved Sea Sparrow Missile) – Raytheon
- AMRAAM (Air-to-Air missile) – Raytheon
- NSM (Booster) – Kongsberg
- EXOCET MM40 Block 3 (Booster with TVC) – MBDA
- IRIS-T (Air-to-Air missile with TVC) – Diehl BGT Defence
- IRIS-T SL (Ground-to-Air missile with TVC) – Diehl BGT Defence
- IDAS (Self-defense and attack missile for submarines) – HDW & Diehl
- Penguin MK2 Mod6 and Mod 7 (Booster & Sustainer) – Kongsberg

**Nammo**

# QinetiQ

**QinetiQ** has established a global reputation as a provider of impartial advice and innovative solutions across the defence and security markets. Capitalising on our expertise and unique facilities, we work with our customers to help them find answers to technically demanding questions. While our heritage is in research, test and evaluation performed on behalf of the UK Ministry of Defence (MoD), we are today a trusted supplier to more than 40 nations.

QinetiQ's Maritime business demonstrates our deep knowledge and rich experience in the Submarine domain. We bring together submarine consultancy, systems integration and ranges operations to create a portfolio of services used in the development of concepts and analysis of Future Submarine solutions (for example the UK Successor submarine), support the introduction into service of new submarines (such as the Astute Class) and provide technical services and support to the UK in-service submarine flotilla including operational ranging.

**Our total capability, based on multiple technical disciplines, encompasses technical advice, design support, systems integration, test and evaluation to support assurance. These include:**

- naval architecture
- hydrodynamics
- shock and survivability
- submarine escape, rescue, abandonment and survival
- diving and life support
- combat systems and sensors
- communications and networks
- signature measurement and management

QinetiQ Maritime is unique, skills are underpinned by a range of specialist maritime facilities including our Ocean Basin and Ship Tank, our Diving and Hyperbaric Test Centre and our sea ranges. We apply some of the finest scientific, engineering technical minds to turn visionary thinking into practical problem-solving, using our Maritime sector expertise to pioneer new solutions and groundbreaking techniques.

Building on our long-term relationships with the UK Ministry of Defence, we are committed to meeting the design, test, evaluation, integration and assurance needs of a global client base across the maritime domain.



**ELECTRONICON AS**  
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**ELECTRONICON AS**  
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+47 55 30 76 60  
elc@electronicon.no

**Electronicon AS** has been a local provider of services and equipment to the Royal Norwegian Navy since 1969.

Specializing within the field of maritime electronic systems such as Command and Control, Tactical data link, Navigation sensors and distribution, Radar, Sonar and Communication system.

Electronicon AS has contributed in many large programs the last 20 years, either as a partner to a major supplier or as prime.

In addition Electronicon AS has over the last years developed capabilities within Navigation data distribution and interface systems. Our systems is today installed onboard most ship classes within the Navy as well as in some foreign navies.

The current major programs Electronicon AS is involved in are: Helicopter control radar on Nansen class frigate (with Reutech Radar Systems), Navigation Interface unit on Ula class submarine and Link 11 update on 4 coast guard vessels (together with Exelis)

In addition Electronicon AS represents L3 ELAC delivering sonar systems and OSI delivering WECDIS and bridge systems. At our stand at the Sea Power Seminar in Ulvik this year, Electronicon AS is proud to present Adaptive Methods.

Specializing within the field of Sonar and C4I capabilities for surface, subsurface and maritime patrol aircraft.

Customers include PEO-IWS, PEO-C4I, ONR and DARPA

Capabilities include development and implementation of techniques, algorithms, software and specialized HW components for ASW Combat Systems, C4I Systems, acoustic ranges, modeling and simulation systems, acoustic arrays and UUVs.

Current major programs being supported include SQQ-89 CG/DDG/ LCS ASW Combat System, SQQ-34/CV-TSC Carrier ASW Combat System, AN/UYQ-100 USW-DSS, CG/DDG ASW C4I and P-8 Mission Planning Systems.



# Participants

1.	Lekven	Anders	Captain	President Sjømilitære Samfund
2.	Amundsen	Henning	Commodore	SJKE
3.	Armo	Knut Rief	Commander SG	FST
4.	Augier	Pascal		Thales Communcations & Security
5.	Bauer	Øistein	Commander SG	FHS/FSTS/FOPS
6.	Behring	Pål	Commander / Salgssjef	Equipnor
7.	Berdal	Oliver	Commander SG	FD
8.	Blom	Martin	Senior Adviser	FD
9.	Bratli	Kjell Arne	Captain	Ombudsmann for Forsvaret
10.	Bratlie	Pål	Director	Missile Systems KDS
11.	Buhart	André		Thales Staff
12.	Bøe	Knut Henrik A		FLO/MARKAP/UVB
13.	Børresen	Jacob	Commodore / Sr rådgiver	
14.	Børresen	Vidar	Commander Strategisk Rådgiver	NAMMO
15.	Dahle	Tom Frihagen	Market Director	KDS
16.	Dahle	Thomas Nilsen	Market Director	Sonar Kongsberg Maritime Sub Sea
17.	Diaz	Noelia Fernandez	Engineer	NaCoM Energy
18.	Edling	Per	KommandørkapteinChief og Staff	Ubåtsflotiljen
19.	Eidem	Mads	Commander SG	Proj Manager Submarines beyond 2020
20.	Eriksen	Jan-Børre	Sen Cons	FLO MARKAP
21.	Eriksen	Stein Ivar	Brigader / Sen rådgiver	FSI / NHO
22.	Eriksen	Torkel	Commander SG	FLO/MARKAP/UVB
23.	Fleisje	Lars Johan	Commodore	STSJ Sjøforsvarsstaben
24.	Folkestad	Helene	Liutenant	KNM Uthaug Ops offiser
25.	Fossheim	Edgar	CEO	NAMMO
26.	Gallagher	Kelly	Babcock Marine & Tech Div	
27.	Gibbs	Tom	Naval Architect	BMT Defence Services
28.	González	Maria del Carmen	Adviser	NAVANTIA
29.	Goodfellow	Iain	Babcock Marine & Tech Div	
30.	Grabow	Andre	Surveyor	Germanische Lloyd SE
31.	Grimstvedt	Bernt	Rear Admiral	GIS
32.	Gøransson	Per Erik	Captain	Strategisk rådgiver NAMMO
33.	Hagen	Nils Oddvar	Director Naval Systems & Surveillance	KDS
34.	Hald	Leif	Commander / Consultant	
35.	Hammer	Anne-Lise	Chief of Public Relations	FFI
36.	Handegård	Per magne		FLO/MARKAP/UVB
37.	Hansen	Svein-Roald	Member of Parliament	Labour Party
38.	Hanssen	Knut Morten	Commander SG	FLO/MARKAP/UVB
39.	Hansson	Fredrik	Military Advisor	Swedish Def. And Security Exp Agency
40.	Hardy	Tim	Head of Naval Engineering	BMT Defence Services
41.	Harildstad	Geir	Generalmajor / Rådgiver	NAMMO
42.	Haugen	Martin	Mil Supply Ops	Scandinavian Bukering

43.	Hedin	Per-Ola	Naval Architect / Marketing Director	Kockums AB
44.	Helgesen	Jan-Petter	Journalist	Stavanger Aftenblad
45.	Helgesen	Rune Helmik	Director	Equipnor
46.	Hjort	Christian Bugge	Gensekr	Norges Forsvarsforening
47.	Hope	Pål Øystein	Commander SG Chief of Staff	Submarine Services Kysteskadren
48.	Horner	Dominic	Int Sales Manager	QinetiQ
49.	Hovaere	Michel		Thales Underwater Systems
50.	Huseby	Dag Eivind	Director M & S-Naval	Thales Norway AS
51.	Itard	Xavier	Captain / Military Engineer	DCNS
52.	Jensen	Jens Jørgen	Commodore / Redaktør NTfS	
53.	Johannessen	Ole Jørgen	Førsteamanuensis	UiB
54.	Johnsen	Kirsten	Senior Consultant	
55.	Johnstad	Ragnar	Partner	Inventura AS
56.	Jokstad	Georg	Commander	Marineprest Hovedstyre SMS
57.	Josefsen	Bjørn Domaas	Redaktør	Militær Teknikk
58.	Kilhus	Geir	Commodore	Sj FLO/MARKAP
59.	Kjeldsberg	Pål	Market	Missile Systems KDS
60.	Kjelstrup	Hans-Christian	Commander SG	Konferanseleder 29.august
61.	Kjønigsen	Svein	Market Director	KDS
62.	Knudsen	Atle	Commander SG	Sj FLO/MARKAP/UVB
63.	Kongelf	Hans Jørn	Director Market	Missile Systems KDS
64.	Kristensen	Dag	Managing Director	Bertel O Steen Industri AS
65.	Kristoffersen	Even Widerøe	Commander SG	
66.	Krohn	Bjørn	Generalsekretær	Sjømilitære Samfund
67.	Kvalvaag	Svein Erik	Captain	Vice President SMS
68.	Landgraf	Jørg	Manager Sales Submarines	ThyssenKrupp Marine Systems
69.	Leroux	Patrick	Rear Admiral	DCNS
70.	Liatun	Einar	Commander SST	Project Coordinator New Subs Navy Staff
71.	Lie	Arne	Sen Cons	FLO MARKAP
72.	Lien	Arnth	Captain	Kysteskadren
73.	Lilleheim	Johan Henrik	Captain	Æresmedlem SMS
74.	Lofstad	Ben Henning	Commander SG	FD
75.	Lozano	Israel	Adviser	NAVANTIA
76.	Lund	Bjarte	Captain SG	FLO/MARKAP/UVB
77.	Melkevik	Arvid	Project Manager Submarines	FFI
78.	Minde	Erling	Senior Engineer	FLO/MARKAP/UVB
79.	Mjell	Gunnar	Colonel	Director Gunnar Mjell Consulting
80.	Mohr	Conrad	Commander	Director
81.	Mortvedt	Sjalg Ture	Commander/ Adm dir	Oswo AS
82.	Myraune	Lars	Member of Parliament	Conservative Party
83.	Nakken	Kenneth	Chief og Program	NS&S KDS
84.	Namdal	Ingrid	Senior Consultant	Inventura AS
85.	Nielsen	Svein	Director	FLO Yards
86.	Nordberg	Evgeni T	Mil Supply Ops	Scandinavian Bukering
87.	Noreng	Audun	Senior Adviser	Berthel O Steen



88. Olsen	Dag Tangen	Redaktør	Norges Forsvar
89. Olsen	Jon Patrick	Commander SG	FLO/MARKAP/UVB
90. Pedersen	Sigbjørn	Commander SG	Utstillingskoordinator
91. Pedersen	Trygve	Commander SG	FST
92. Pedersen	Glenn	Director General	Thales Norway AS
93. Pickard	Ian	Principal Consultant	Future UW Platforms QinetiQ
94. Przyklang	Janusz	Naval Arch /Sales Area Manager	DCNS
95. Reitan	Hein	Commander SG	FLO MARKAP
96. Reksten	Jan	Vice Admiral	
97. Robertsen	Jim	Kommandørkaptein	SjUVB Training Est.
98. Rognan	Lars Andreas	Information Consultant /Liaison	Folk & Forsvar
99. Rosenberg	Eva Vibeke	Senior Consultant	
100. Simonsen	Egil	Adm direktør	Electronicon AS
101. Skaug	Harald Hovda	Captain	FD IV
102. Smith	Sigurd	Captain	STSJ FLO MARKAP
103. Smith	Steve	Babcock Marine & Tech Div	
104. Sommerfelt-P	Jan	Captain	Sansjef i Sjøforsvaret
105. Steig	Leiv Inge	Market Director	NS&S KDS
106. Storebø	Øystein	Commander SG	SST
107. Straten	Carl Erik thor	Commander / Director Market	
108. Strøsnes	Laila V	Økonom	NaCoM Energy
109. Stubberud	Tore	Captain	STSJ INI
110. Størdal	Johan-Mikal	CEO	FFI
111. Svendsen	Åge Bernt	Commander SG	SST
112. Tamnes	Rolf	Director	Professor IFS
113. Tejuca	Enrique González		NAVANTIA
114. Thomas	Megan	Babcock Marine & Tech Div	
115. Torp	Lars Magnus	Market Director	AUV Kongsberg Maritime Sub Sea
116. Tronstad	Håkon	Commodore	FHS
117. Tucker	Michael	Director	Adaptive Methods
118. Tveit	Elling	Chief og Branch	FFI
119. Tveiten	Frank	Market Director	NS&S KDS
120. Urheim	Christian	Market Director	NS&S KDS
121. Utne	Sigurd		FLO/MARKAP/UVB
122. Wangsholm	Arne	Captain	FLO / MARKAP
123. Wensel	Tore A		FLO/MARKAP/UVB
124. Westerman	Ronnie T	Senior Lead Surveyor	Germanische Lloyd Norge AS
125. Whybrow	Nigel		Babcock Int Group
126. Winter	Terje	Commander	FLO/MARKAP/UVB
127. Øhlund	Gunnar	Sen Vice President	Kockums AB
128. Østvedt	Arne	Commander	FLO / MARKAP
129. Aabrek	Kjell-Knut	Commander	Naval Academy
130. Åhjem	Magne	Photografer	FLO
131. Aalborg	Christian	Market	Equipnor
132. Ånnestad	Harald	CEO	Kongsberg Defence Systems



# KONGSBERG

Kongsberg Gruppen (KONGSBERG) is a multi-national knowledge based company with 4400 employees in more than 25 countries. The company delivers high technology systems to demanding customers within offshore oil and gas production, the merchant fleet, armed forces and space programs. KONGSBERG is listed on Oslo Stock Exchange and had a turnover of NOK 15,128 (15,497 in 2010) billion in 2011 with 6681 (5681) employees. 68 (70)% of the work force is located in Norway.

KONGSBERG has two daughter companies:

## **KONGSBERG MARITIME** (including Kongsberg Oil & Gas Technology)

is the market leader for dynamic positioning systems, automation and surveillance systems, process automation, satellite navigation and hydro acoustics. The company's turnover in 2011 was NOK 6,693 (6,286) billion and the number of employees was 4025 (3409).

### **The company delivers high technology systems for:**

- Dynamic positioning systems to keep ships and platforms in the correct position during demanding weather conditions.
- Automation and surveillance systems for engine rooms and cargo and propulsion systems.
- Navigation systems for the bridge in merchant and offshore vessels.
- Process automation of complete systems for control and security of oil platform operations and offshore oil production ships.
- Subsea activities within hydro acoustic products for sea bed mapping and subsea communications and positioning.
- The fishing activity (Simrad) makes subsea systems for fishing ships and fish research ships.
- Simulators and training systems for most of the products.

## **KONGSBERG DEFENCE & AEROSPACE** (Kongsberg Defence Systems and Kongsberg Protech Systems)

is the leading provider of defence and space related systems. The company's turnover in 2011 was NOK 8,080 (9,059) billion and the number of employees was 2540 (2166).

The company provides high technology defence systems to the Norwegian Armed Forces which is the most important customer. Products developed for this customer have been internationally price competitive and have achieved a large export to foreign countries.

### **The company provides systems and products within these areas:**

- Weapon control systems for protection of operators of armored vehicles (Remote Controlled Weapon Station, PROTECTOR) and protection of ships.
- Command and weapon control systems and different command and control systems for land and air and sea based defence systems.
- Surveillance systems for civilian and military and other maritime and land based installations.
- Anti ship missiles. Develops and produces the Penguin anti ship missile and the NSM missile for sea and land targets. It is designed for multi platform operations. It has an imaging IR seeker based on world leading seeker technology. The Joint Strike Missile (JSM) is under development for airborne operations.
- Tactical communication systems for land based Defence Forces.
- Space activities. The company is the leading Norwegian provider of space systems to the European Space Association. This includes equipment for launch rockets and satellites.
- Simulation and training systems for land and naval operations.

